Supreme Court of the United States.

OCTOBER TERM, 1902.

THE STATE OF MISSOURI, COMPLAINANT, *vs.* THE STATE OF ILLINOIS ET AL.	*No. 4, Original.*

MOTION TO MODIFY ORDER FOR TAKING TESTIMONY.

Now come the solicitors for plaintiff and defendants in the above-entitled cause, and move the court to modify the order for the appointment of a Special Commissioner to take testimony in this case, entered November 17, 1902, so that the second paragraph of said order will read as follows:

It is further ordered, That the taking of testimony on complainant's behalf shall begin on the fifth day of March, A. D. 1903, at such place as counsel for complainant may designate, ten days' notice thereof to be given counsel for defendants, and shall be concluded on or before the thirtieth day of April, A. D. 1903; that the taking of testimony on behalf of defendants shall commence on the first day of May, and be concluded on or before the first

day of July, A. D. 1903, ten days' notice of the place where such testimony will be taken being given to counsel for complainant; that testimony in rebuttal shall then be taken, five days' notice of the place being given, and shall be concluded on or before the fifteenth day of July, A. D. 1903; and thereafter defendants may take further testimony until the first day of August, A. D. 1903, at which time the taking of testimony in the cause shall be closed.

This motion is submitted on account of the serious illness of Attorney General Crow, one of the solicitors on behalf of the complainant.

WILLIAM M. SPRINGER,
On behalf of the Solicitors for the Plaintiff and Defendants.

IN THE

Supreme Court of the United States.

OCTOBER TERM, 1899.

NUMBER 7, ORIGINAL.

THE STATE OF MISSOURI, COMPLAINANT,

v.

THE STATE OF ILLINOIS AND THE SANITARY DISTRICT OF CHICAGO, DEFENDANTS.

Demurrer of Defendants to Bill of Complaint.

Now comes the State of Illinois by its Attorney General, Edward C. Akin, and the Sanitary District of Chicago, by its attorneys, and demur to the Bill of Complaint filed herein, and say, that the said Bill of Complaint and the matters therein contained, in manner and form as the same are above stated and set forth, are not sufficient in law for the said State of Missouri to have and maintain its aforesaid action against the said State of Illinois and the Sanitary District of Chicago, and that said Defendants are not bound by the law of the land to answer the same; and the said Defendants, according to the form of the Statute in such case made and provided, state and show

to the Court here the following causes of demurrer to the said Bill of Complaint:

FIRST: That this Court has no jurisdiction of either the parties to, or of the subject matter of, this suit, because it appears upon the face of said Bill of Complaint that the matters complained of, as set forth therein, do not constitute, within the meaning of the Constitution of the United States, any controversy between the State of Missouri and the State of Illinois, or any of its citizens.

SECOND: That the matters alleged and set forth in said said Bill of Complaint show that the only issues presented therein arise, if at all, between the State of Illinois and a public corporation created under the laws of said State, and certain cities and towns, in their corporate capacity as such, in the State of Missouri, and certain persons in said State of Missouri, residing on or near the banks of the Mississippi river, and which matters so stated in said Bill of Complaint, if true, do not concern the State of Missouri as a corporate body or State.

THIRD: That said Bill of Complaint shows upon its face that this suit is in fact for and on behalf of certain cities and towns in said State of Missouri, situate on the banks of the Mississippi river, and certain persons who reside in said State on or near the banks of said river; and that, although the said suit is attempted to be prosecuted for and in the name of the State of Missouri, said State is, in effect, loaning its name to said cities and towns and to said individuals, and is only a nominal party to said suit, and that the real parties in interest are the said cities and towns in their corporate capacity as such, and said private persons or citizens of said State.

FOURTH: That it appears upon the face of said Bill of Complaint, that the said State of Missouri, in her right of sovereignty, is seeking to maintain this suit for the re-

dress of the supposed wrongs of certain cities and towns in said State, in their corporate capacity as such, and of certain private citizens of said State, while under the Constitution of the United States and the laws enacted thereunder, the said State possesses no such sovereignty as empowers it to bring an original suit in this Court for such purpose.

FIFTH: That it appears upon the face of said Bill of Complaint, that no property rights of the State of Missouri are in any manner affected by the matters alleged in said Bill of Complaint; nor is there any such property right involved in this suit as would give this Court original jurisdiction of this cause.

SIXTH: That in order to authorize this Court to maintain original jurisdiction of this suit as against the State of Illinois, or against any citizens of said State, it must appear that the controversy set forth in the Bill of Complaint and to be determined by this Court, is a controversy arising directly between the State of Missouri and the State of Illinois, or some of its citizens, and not a controversy in vindication of the alleged grievances of certain cities and towns in said State or of particular individuals residing therein.

SEVENTH: That said Bill of Complaint is in other respects uncertain, informal and insufficient, and that it does not state facts sufficient to entitle the said State of Missouri to the equitable relief prayed for in said Bill of Complaint.

Wherefore, for want of a sufficient Bill of Complaint in this behalf, the said Defendants pray judgment; and that the said State of Missouri may be barred from having or maintaining the aforesaid action against said Defendants, and that this Court will not take further cognizance of

this cause, and that the said Defendants be hence dismissed with their costs.

THE STATE OF ILLINOIS,
By EDWARD C. AKIN,
Attorney General of the State of Illinois.

CHARLES C. GILBERT,
SAMUEL M. BURDETT,
Attorneys of the Sanitary District of Chicago.

WILLIAM M. SPRINGER,
Of Counsel for Defendants.

I, William M. Springer, of counsel for the said Defendants, do certify that the above demurrer is, in my opinion, well founded in point of law.

WILLIAM M. SPRINGER,
Of Counsel for Defendants.

I, William M. Springer, of counsel for said Defendants, upon my oath do say, that the above demurrer is not interposed for delay.

WILLIAM M. SPRINGER,
Of Counsel for Defendants.

Subscribed and sworn to before me this 17th day of March, 1900.

[L. S.] EDWD. N. LEWIS,
Notary Public.

IN THE

Supreme Court of the United States.

OCTOBER TERM, 1899.

NUMBER 7, ORIGINAL.

STATE OF MISSOURI, COMPLAINANT,

v.

STATE OF ILLINOIS AND THE SANITARY DISTRICT OF CHICAGO, DEFENDANTS.

Separate Answer of The State of Illinois to the Bill of Complaint of the said State of Missouri.

Now comes the State of Illinois by Edward C. Akin, Attorney General of the State of Illinois, not waiving the demurrer filed herein, and in which this Defendant joins but wholly relying thereon, for answer to so much of said Bill of Complaint as it is advised it is material and necessary for this Defendant to answer unto, does say:

That this Defendant, the State of Illinois, has by its Attorney General, read the separate answer of the Sanitary District of Chicago, its co-defendant, and that in so far as said separate answer admits certain allegations contained in the Complainant's Bill of Complaint, filed herein, this Defendant, the State of Illinois, makes

the same admissions in this its separate answer without repeating the same admissions to said answer of its co-defendant thereon. That this Defendant, the State of Illinois, as to all allegations contained in said Bill of Complaint, which are specifically denied by the separate answer of its co-defendant, filed herein, unites in such denial and makes said Bill of Complaint its own in this respect. And furthermore, this Defendant unites with its co-defendant in making the allegations of new matter by way of defense set up by its co-defendant in its answer, filed herein, and makes said allegations its own in so far as this Defendant is required to make answer to said Bill of Complaint; and this Defendant refers this Honorable Court to the separate answer of its co-defendant, filed herein, and makes said answer its own, in so far as this Defendant, the State of Illinois, is required to make answer in this cause.

This Defendant avers that the laws of the State of Illinois, mentioned in its co-defendant's answer, and filed as exhibits therein, were passed by the General Assembly of the said State of Illinois, at the times mentioned, in pursuance of the authority vested in said General Assembly, and that the said acts are valid under the Constitution of the State of Illinois, and that said General Assembly was clothed with ample authority by the Constitution of the State of Illinois to pass said laws; and that the passage thereof was a proper and constitutional exercise of the power conferred upon said General Assembly.

And for further answer herein, this Defendant avers that the Sanitary District of Chicago, its co-defendant, in exercising the authority conferred upon it by the laws of the State of Illinois, is not subject to the control of the executive department of the State of Illinois, and that it is not within the power of the Governor of said State to

control the officers of its co-defendant, said Sanitary District of Chicago, in the performance of their duties as such officers.

And this Defendant, the State of Illinois, admits that under said laws of the State of Illinois, it was the duty of the Trustees of the Sanitary District of Chicago to notify the Governor of the said State of Illinois of the completion of the said canal or channel, and that it was the duty of the Governor of the State of Illinois to appoint three commissioners to examine said canal or channel, as alleged in Complainant's Bill of Complaint. And this Defendant alleges that prior to the time when the Complainant in this case presented its motion in this Honorable Court, for leave to file its Bill of Complaint herein, that the Governor of said State had appointed said commissioners as required by the laws of said State, and the said commissioners had reported to him that they had examined said canal or channel, and had found it in all respects completed in conformity with law, and that the Governor of said State, prior to said time, issued a permit to the Trustees of the said Sanitary District of Chicago, to turn the water and sewage of said drainage district into the Des Plaines and Illinois Rivers; and that said Trustees did, prior to the time aforesaid, turn said water and sewage into said Rivers, as this Defendant is informed and believes, as will more fully appear to this Honorable Court, by reference to the separate answer of the said Sanitary District of Chicago, filed herein; and as to all said allegations in the said separate answer of the Sanitary District of Chicago, filed herein, in reference to the appointment of said commissioners, their report to the Governor, and the action of the Governor of said State of Illinois in the premises, this Defendant avers that the allegations in the answer of its co-defendant are true;

and that the said acts of the Governor of the State of Illinois were all done and performed prior to the 17th day of January, 1900, when the Complainant herein moved this Honorable Court for permission to file said Bill of Complaint.

Therefore this Defendant avers that the State of Illinois cannot now be enjoined or restrained from issuing to its co-defendant herein, permission or authority to do and perform the acts aforesaid, or to allow them to be done.

This Defendant, the State of Illinois, further admits as alleged in said Bill of Complaint, that by the general provisions of the Act of the State of Illinois, creating the Sanitary District of Chicago, the said canal or channel to be constructed by said Sanitary District is at all times subject to the control and supervision of the State of Illinois and of her authorities. But this Defendant avers that said control and supervision can only be exercised by and through the law-making power of the said State of Illinois; and that the only authorities of said State, authorized by said laws to control and supervise said canal or channel are the Board of Trustees of the Sanitary District of Chicago, their officers, agents and employees.

And this Defendant, the State of Illinois, denies all unlawful combination in said bill charged without that any other matter or thing material for it to make answer to, and not herein sufficiently answered, avoided, or denied, is true, to the knowledge or belief of this Defendant. All of which matters and things this Defendant is ready to aver and prove, as this Honorable Court shall direct, and it prays to be hence dismissed with its reasonable costs and charges in this behalf most wrongfully sustained.

THE STATE OF ILLINOIS,
By EDWARD C. AKIN,
Attorney-General of the State of Illinois.

UNITED STATES OF AMERICA.
In the
Supreme Court of the United States.

On this 7th day of March, 1900, before me, James T. Jones, Clerk of the Circuit Court of the United States for the Southern District of Illinois, personally appeared John R. Tanner, Governor of the State of Illinois, one of the Defendants in the foregoing Bill of Complaint above named, [who] being by me duly sworn, deposes and says, that he is the Governor of the said State of Illinois, and familiar with its affairs and business; that he has read the foregoing separate answer of this Defendant, the State of Illinois, and also the separate answer of its co-defendant, the Sanitary District of Chicago, and that he knows the contents thereof, and the same are true of his own knowledge, except as to the matters stated on information and belief, and as to those matters he verily believes them to be true.

JOHN R. TANNER,
Governor of the State of Illinois.

Subscribed and sworn to before me by John R. Tanner this 7th March, 1900.

[L. S.] JAMES T. JONES,
Clerk Circuit Court U. S. South. Dist. Ills.

IN THE

Supreme Court of the United States.

OCTOBER TERM, 1899.

NUMBER 7, ORIGINAL.

STATE OF MISSOURI, COMPLAINANT,

v.

STATE OF ILLINOIS AND THE SANITARY DISTRICT OF CHICAGO, DEFENDANTS.

Separate Answer of the Sanitary District of Chicago to the Bill of Complaint of the State of Missouri.

Now comes the Sanitary District of Chicago, one of the Defendants in the above-entitled cause, not waiving the demurrer to the said Bill of Complaint heretofore filed in this cause, but wholly relying thereon, for answer to so much of said Bill of Complaint as it is advised is material and necessary for this Defendant to answer unto, does say:

That it admits that the Complainant herewith is one of the States of the United States, and that the State of Illinios, one of the Defendants herein, is one of the States of the United States, and that this Defendant, the Sani-

tary District of Chicago, is a public corporation, organized under the laws of the State of Illinois and located as in said bill described, and is a citizen of said State. This Defendant further admits that the population of the State of Missouri is upwards of three millions of people, and that said State lies on the west bank of the Mississippi River, a public, navigable, and running stream, having a frontage on said stream of over four hundred miles; that by act of Congress providing for the admission of Illinois and Missouri as States of the Union, it was declared that the western boundary of Illinois and the eastern boundary of Missouri should be the middle of the main channel of the Mississippi River; that the shores of the Mississippi River, where its waters form the Missouri and Illinois boundaries, and the soil under the waters thereof, were not granted by the Constitution of the United States, but were reserved to the States of Illinois and Missouri respectively.

This Defendant further admits that the States of Missouri and Illinois, each have concurrent general jurisdiction over the waters of the Mississippi River, forming the boundary between them, and each of said States has exclusive territorial jurisdiction over that portion adjacent to its own shore; and that the Illinois River empties into the Mississippi River at a point above the City of St. Louis, on the Illinois side of said Mississippi River.

This Defendant further admits that within the territory of the State of Missouri and on the banks of said Mississippi River, and below the mouth of the Illinois River are many cities and towns in the State of Missouri, and many thousands of persons who rely upon the waters of said Mississippi River, in their regular, natural, and accustomed flow, for their daily necessary supply of water, for drinking and all other domestic, agricultural,

and manufacturing purposes, and for watering stock and animals of all kinds, and that said Mississippi River has been flowing in its regular course, and has been used for the purposes aforesaid by the inhabitants of said State of Missouri for a time whereof the memory of man runneth not to the contrary. But whether the river and its waters, and the use thereof, for drinking, agricultural, and manufacturing purposes, in their accustomed and natural flow, are indispensable to the life, health, and business of many thousands of inhabitants of the said State of Missouri, and whether said inhabitants are compelled to use said waters for said purposes, this Defendant neither admits nor denies, but leaves said Complainant to make proof thereof; but said Defendant denies that said river and its waters, and the use thereof, for drinking, agricultural, and mechanical purposes are of value to the State of Missouri as a State or as a body politic.

This Defendant further admits that the cities and towns below the mouth of the said Illinois River, within the territory of the said State of Missouri, do by means of waterworks, water-towers, and intakes, built and constructed for that purpose, supply the inhabitants of said cities and towns with an adequate supply of water for drinking and other domestic uses, from the said Mississippi River; but whether said cities and towns are compelled to use the water for drinking and other domestic purposes, or whether said cities and towns are furnished with an adequate supply of pure and wholesome water, fit and healthful for drinking, and other domestic purposes and uses, from said Mississippi River, this Defendant neither admits nor denies, but leaves Complainant to make proof thereof.

Further, this Defendant neither admits nor denies that

said waterworks systems are constructed with reference to said Mississippi River, for the purpose of taking water therefrom, and not from any other source, and leaves Complainant to make proof thereof.

This Defendant admits that heretofore, to wit: In 1889, the State of Illinois enacted a law known as the Sanitary District Act, together with an act for the improvement of the Illinois and Des Plaines Rivers, and that under said act of said State, the said defendant corporation, known as the Sanitary District of Chicago, was organized and is now existing and operating, and that by the express terms of said act, any canal or drainage corporation organized in accordance with its provisions may have conditions, restrictions, or additional requirements placed on said corporation, or the act, authorizing the creation of said corporation may be amended or repealed, and that by the express provisions of said act, before any water or sewage shall be admitted into any channel constructed under said act, the trustees of said channel should notify the Governor of the State of Illinois of the completion of said channel, and that the Governor of the State of Illinois should appoint three commissioners to examine said channel or canal and report to the Governor of said State of Illinois, whether the same complied with the said act of the State of Illinois; and that if it does, the Governor should authorize the water and sewage to be turned into said canal or channel; and without the said permit said water and sewage cannot be so turned in; and by the general provisions of said act, said channel is at all times subject to the control and supervision of the State of Illinois and her authorities; but this Defendant avers that such control and supervision can only be exercised by the law-making power of said State.

This Defendant further admits that the Chicago River

is situate in the basin of Lake Michigan, and has forks or branches flowing through the City of Chicago and into Lake Michigan, and that the natural drainage of Chicago is or has been into Lake Michigan, but this Defendant denies that the drainage and sewage of the territory embraced in this Defendant's district, namely, the Sanitary District of Chicago, is led or flows into the Chicago River and Lake Michigan; but this Defendant avers and will establish the fact by sufficient proof to the satisfaction of this Honorable Court, if permitted to do so, that the greater portion of the water and sewage of said territory has been, for many years discharged into the Des Plaines and Illinois Rivers, in the manner which will be pointed out and particularly described hereinafter in its answer.

This Defendant, further answering admits, as will be hereinafter more fully shown, that it has constructed a drainage canal, having origin and extent described in said bill; that in the construction of said canal or drain, this Defendant cut through the natural ridge or water-shed, which divides the basin of Lake Michigan from the basin of the Des Plaines and Illinois Rivers, and of the Mississippi River. The origin, extent, and public history of said drainage channel will hereafter be more fully recited in this answer.

But this Defendant denies that all or any considerable portion of the sewage and drainage of the territory embraced in its said district is led into or flows into the Chicago River and Lake Michigan, and to this allegation this Defendant will make fuller answer as hereinbefore stated.

This Defendant expressly denies that its acts and doings in Complainant's Bill mentioned, and hereinafter described, have been without legal authority, but on the contrary says that each and every of its acts have been in strict pursuance of authority given it by the State of Illinois.

This Defendant further admits, not alone that it has about completed the said drainage channel, but states that it has completed the same, and that it is about to receive and has received into said channel the sewage matter and filth of the Sanitary District of Chicago, which embraces nearly the entire City of Chicago, and a portion of the County of Cook, and that it is about to cause and has caused said sewage and filth to flow through said channel or drain towards and into the Des Plaines River; but that the said sewage and filth will be carried into said Mississippi River, and that it will pass by the homes of the inhabitants of the State of Missouri, or of the cities and towns and their waterworks, within said State, this Defendant denies.

This Defendant admits that the sewage matter and filth which it is now receiving and causing to flow through said drainage channel into said Des Plaines River, is that which is created by the population and activities and industries of the district of this Defendant; that among those industries are stockyards, slaughtering establishments, and rendering establishments, but not distilleries; and this Defendant denies that noxious matters created by said establishments will be received into said channel, but on the contrary thereof, this Defendant alleges that the said noxious matters are in large part, if not wholly, rendered innocuous before being received into the sewage system of the City of Chicago and of said drainage district, and this Defendant denies that there are any distilleries within the said district. This Defendant further denies that it is true, as stated in said Bill of Complaint, that the City of Chicago has been discharging its sewage matter and filth into said Chicago River and into Lake Michigan, in such large quantities, that much of it has accumulated upon the bed and along the sides of said

river, and upon the bed of said lake, near the shores thereof; and it especially denies that the plan adopted and in operation by this Defendant will loosen said matter and filth so alleged, to be deposited upon the bed of the lake and the sides of the river, and the shores of said river and lake and cause it to flow into and towards said Des Plaines River; but on the contrary thereof, Defendant says, as it is more particularly hereinafter set forth, that for many years a large portion of the sewage matter arising in said drainage district, has been turned into the Chicago River, and has been pumped into a drainage channel heretofore constructed, and has flowed into the Des Plaines River. This Defendant especially denies that the plan of operation adopted by it will loosen any accumulated matter or filth, but on the contrary thereof, it says, that it denies the presence of said accumulated matter and filth, at the points and to the extent in said bill alleged, and states that during a long time preceding the opening of Defendant's channel, such of the sewage and filth of said district as has been discharged into the Chicago River and flowed thence into Lake Michigan, had been taken up and dissipated by the cross-currents of Lake Michigan, and carried to distant points, and has wholly lost its noxious character, and that much of said matter as might from time to time have accumulated in the past has been covered upon the bottom of said lake by the deposits thereon of earth excavated from the foundations of the city, and deposited in said lake for the making of new lands.

This Defendant denies that if it shall carry its plans into execution, and shall carry all the sewage and alleged noxious matters arising in said Sanitary District into the waters of the Des Plaines River, through said drainage channel, that the waters of the Mississippi River will of a certainty or at all be poisoned and polluted thereby, as

alleged in said Bill of Complaint; and it expressly denies that the carrying out of its plans will destroy the flow and adaptability of the waters of the Mississippi River, along the territory of Complainant, for domestic or other uses. And it expressly denies that such use will render wholly valueless and entirely worthless the said waterworks systems of the cities and towns located in State of Complainant; or that it will injure and destroy the business of the cities and towns in State of Complainant, in furnishing and selling water to private consumers, or that it will disable them from furnishing water for domestic or any other purposes. And this Defendant expressly denies that it will injure the property and business of said cities and towns, or that it will establish and create as to them a direct and continuing nuisance, with the results in said bill described, or any injurious results; and it expressly denies that any damage will result to said Complainant or to said cities and towns, or inhabitants of Complainant, from such use and carrying out of the plans of this Defendant.

This Defendant neither admits nor denies, as alleged by Complainant in its Bill of Complaint, that the filth and sewage of the Sanitary District of Chicago, which will be turned into the Des Plaines River, will amount to 1,500 tons daily, but leaves the Complainant to make proof thereof; but this Defendant denies that said filth and sewage, or any part thereof, will be deposited in the bed or soil of the Mississippi River, within the jurisdiction of Complainant; and this Defendant denies that the filth and sewage of the said Sanitary District of Chicago will pollute and poison the waters of the said Mississippi River to such an extent as to render said waters unwholesome, unfit, and unhealthful for drinking and other domestic uses, by the inhabitants in the territory of Complainant,

or unfit for watering stock and for manufacturing purposes, and this Defendant denies that said sewage from the Sanitary District of Chicago will poison and pollute the waters of the said Mississippi River along the territory of Complainant with germs of diseases of various kinds, or with any germs of disease whatever; and this Defendant denies, as alleged in said Bill of Complaint, that this Defendant will cause a continuing nuisance in the Mississippi River, to the detriment, and irreparable and continuing damage and injury of the said State of Missouri, or an irreparable injury to the lives and health of the citizens or inhabitants of the said State of Missouri; but on the contrary, this Defendant expressly avers, and if permitted, will prove to this Honorable Court, that the turning into the Des Plaines River of the sewage of the Sanitary District of Chicago, together with 300,000 cubic feet per minute of the pure water of Lake Michigan, which will accompany the same, will greatly improve the quality of the waters of the Illinois and Mississippi Rivers, and also greatly improve the conditions which existed prior to the time said sewage and water were turned into said Des Plaines and Illinois Rivers, as will more fully appear hereafter in this answer.

And for other and further answer in this behalf, this Defendant says that the Sanitary District of Chicago is a corporation organized and existing under the laws of the State of Illinois; that it is wholly within the County of Cook, in said State; with power to extend its operations and works beyond the territorial limits of its existence, as will be more particularly hereinafter shown.

This Defendant alleges that in the year 1822 the proper authorities of the United States enacted a law granting to the State of Illinois the right for a route for a canal connecting the Illinois River with the southern bend of Lake Michigan; that on the 2d day of March, 1827, a further

act of Congress of the United States was approved, and by which a quantity of land equal to five sections in width on each side of the canal proposed by said act, was granted to the State of Illinois to aid in the construction of said canal. That subsequently thereto the State of Illinois entered upon the construction of said canal according to various acts of the legislature, and prosecuted the work of completing said canal, so that it was long since opened from Bridgeport to La Salle upon the Illinois River. That there were in the course of the construction of said canal divers levels provided, one of which was known as Summit Level, properly connected with the remaining course of said canal. That a large quantity of the water necessary to supply the said Summit Level of said completed canal was obtained by means of a pump or pumps at or near Bridgeport in Cook County, Illinois, by which the waters of the Chicago River were pumped and discharged into the said Summit Level of said canal. That said pumping was begun in the year 1848 and continued until the year 1871. That said pumps were operated by and at the expense of the State of Illinois, in order to supply said canal with water. But during said period, viz., from 1865 to 1871, the City of Chicago assisted in bearing the expenses of such work, and used the said Chicago River and said canal for the discharge of its sewage, and the said arrangement continued until the year 1871. That in 1865 the Legislature of Illinois by law authorized the City of Chicago to deepen the said Illinois and Michigan Canal, and thereby effect a flow by gravity from the Chicago River into said Summit Level. Reference is hereby made to said public law of 1865, and the same will be exhibited to this Court upon the hearing of this cause, and the same is hereby made a part of this answer and is marked "Exhibit A." And this Defendant avers and

shows the Court that in and by said law of 1865, the City of Chicago was authorized to deepen and did promptly thereafter deepen the said Illinois and Michigan Canal for the express purpose of disposing of the sewage received into the said Chicago River, and did thereafter use said canal for said purpose. That the said Chicago River itsel has in ordinary times no current that is perceptible, but maintains a level with the water of Lake Michigan, and is rather an estuary of said Lake than a river, except in case of flood, when it has a sluggish current settling, not by descent, but by propulsion into the Lake. That since a time prior to 1865, and since the year 1849, since when a large share of the drainage of the City of Chicago has been into said Chicago River, and that from that time until now, by means of said pumps at Bridgeport, and the said deep cut made in pursuance of said act of 1865, the discharge of nearly all of the sewage of the Chicago River has been into said canal and through and down said canal to the Des Plaines River at Lockport.

And this Defendant further answering, says, that the population of the City of Chicago in the year 1890, as determined by the federal census, was about 1,100,000. That from that time until the filing of the Bill of Complaint in this case, there has been an increase of 400,000. That of the 1,500,000 people thus embraced within the limits of the City of Chicago, the sewage of 200,000 of them has been discharged at other points than into the Chicago River, and that the sewage of the residue of the population of said city has at all times been discharged into the Chicago River, and that the whole of the sewage of said residue of said people has been carried by the said pumps into the said deep cut during the whole period aforesaid into the said canal and into the said river, save and except upon such occasions of flood or

unusual instances, few in number, when the current of the river was set into the lake, causing the lake to be roily and polluted near the mouth of said river, and along the shores of Lake Michigan, until the subsidence of said flood.

This Defendant, further answering, says, that such has been, in the period aforesaid, the increase of population and extent of sewage discharged into the Chicago River, that in 1881 it was found necessary to aid the gravity flow of water from the Chicago River into the deep cut by the establishment of larger pumps at Bridgeport, which is a point within the limits of said Sanitary District, in the said County of Cook, and that since said year 1881, a period of nineteen years, the said deep cut and the said pumps have been continuously working, carrying away the said sewage into the said deep cut, and through said canal into the Des Plaines River. And this Defendant alleges that the work of deepening said canal by the deep cut, as it is popularly called, was so extensive that the City of Chicago expended thereon the sum of about three million dollars, viz: $2,955,340; and also a very great sum of money in the erection and operation of the pumps at Bridgeport, as aforesaid, and that all of this work was open and notorious, and in the sight of all men.

And Defendant, further answering, says, that in the year 1889 the Legislature of the State of Illinois passed an act entitled, "An Act to Create Sanitary Districts, and to Remove Obstructions in the Des Plaines and Illinois Rivers," which was duly approved on the 29th day of May, and went into force and effect on the 1st day of July thereafter. That immediately thereafter such proceedings were had that a Sanitary District was formed under the provisions of said Act, which is the district of

this Defendant in this cause. That said district, duly officered, has been in existence since January of the year 1890. Special reference is made to said Act, a copy of which is attached to this answer for greater accuracy, and made a part hereof, and marked "Exhibit B."

And this Defendant, further answering, says, that in pursuance of said act it immediately entered on the discharge of the duties imposed upon it by said act. That it adopted a general plan of construction for the channel, to be of the size, dimensions, and general character mentioned in said act, of 600,000 cubic feet of water per minute. That said channel originates at Robey Street in the City of Chicago, and passes thence through the Counties of Cook, Will and Du Page, by the best determinable lines to Lockport on the Des Plaines River. That in and about preparing for the construction of said channel, this Defendant, in the most open and notorious manner acquired by deed, where possible, the right of way for its various structures, placing the said deeds for said premises upon record in the Recorder's Offices, of Cook, Will and Du Page Counties, as obtained, beginning in the year 1891. That where necessary it instituted condemnation proceedings in the proper courts, of Du Page, Will and Cook Counties. That all of these, its said acts were open and notorious, and this Defendant expressly avers that by the act incorporating it, all of its acts and doings are matters of public record, whereof people and courts are required to take notice, and that its records are and at all times have been open to the inspection of all citizens, and of all persons interested therein. That there are a number of lines of railway passing between the cities of Chicago and St. Louis, one of the cities in the State of Complainant, near to and within plain sight of the work progressing from time to time upon said channel, traversed

by hundreds of thousands of citizens day and night. That such has been the extent and character of the work performed by this Defendant within the time stated, that it became a matter of notoriety to all persons traversing said roads, and that such was the magnitude of the undertaking, the difficulties experienced and overcome, the greatness and scope of the work, that it became noted to all the world, and the subject of innumerable dispatches, communications and publications made from time to time in all cities of the United States. That in the prosecution of this work it has occupied more than four thousand acres of land in the County of Cook alone, more than five hundred acres of land in the County of Du Page, and nearly three thousand acres in the County of Will, at a total cost of more than three million dollars. That during the whole of the nine years since the institution of work upon this enterprise, as aforesaid, this defendant, the Sanitary District of Chicago, has expended upon said work more than thirty-three million dollars. That these expenditures have all been openly, notoriously and of record made in and about the public interest.

And this Defendant, further answering, says, as it has heretofore said, that it had completed its said channel, prior to the filing of the Bill of Complaint in the said cause. That that which physically prevented the opening of the said channel, was but the interposition of a few cubic yards of earth left to protect the work and workmen from the inflow of the Chicago River. That these were removed on the 2d day of January, 1900; and the water turned from the Chicago River into said channel and down to the controlling works at Lockport, filling the said drainage channel for a distance of twenty-eight miles, to an average depth of twenty-two feet, with prisms of water varying from 110 feet in width at the bottom to 200 feet

in width at the bottom, and the width at the water line varying from 160 feet to 290 feet. That this vast body of water moved from the Chicago River and Lake Michigan into this channel between the 2d day of January and the 16th day of January, 1900; and that all that remained to do, in order to complete the great work for which the aforesaid great expenditures have been made was the raising of the gates and the lowering of the bear-trap dam at the bottom of said prism, twenty-eight miles away from the source of supply, and that this was duly and lawfully accomplished at 11.16 o'clock a. m., on the 17th day of January, 1900, prior to the time when Complainant presented its motion to this Court for leave to file its Bill of Complaint herein, and five days prior to the time said Bill was filed by leave of this Court.

Wherefore, and by reason of the premises aforesaid, this Defendant alleges that the said State of Missouri, Complainant herein, had notice of the premises, and of the great work and the great expenditures, which this Defendant alleges were the expenditures of public money raised by taxation, and by the sale of bonds, which are liens upon the tax funds of said District to be hereafter levied; and having such notice as aforesaid, and having so waited as aforesaid, it has been guilty of laches, and has slept upon its rights, if any it ever had, and is estopped to further urge its cause.

And this Defendant, further answering, says, that the drainage channel hereinbefore mentioned was commenced September 3, 1892, that it is constructed through glacial drift, earth and rock, through glacial drift for a distance of 13.1 miles, and through solid rock for a distance of 14.95 miles. That the width of said channel where the same is constructed through glacial drift for 7.8 miles is 110 feet at the bottom and 193 feet at the water line,

and has a capacity of 360,000 cubic feet of water per minute, with a velocity of one and one-quarter miles per hour. That for a distance of 5.3 miles said channel has a width at the bottom of 202 feet, and of 290 feet at the water line, and a capacity of 600,000 cubic feet per minute, with a velocity of one and one-quarter miles per hour. That where said channel is cut through solid rock, it has an average width from top to bottom of 161 feet, with a capacity of 600,000 cubic feet per minute, and a velocity of 1.9 miles per hour. That the carrying capacity of the total channel at the rate of three miles per hour exceeds 360,000 cubic feet per minute, and that this capacity of channel will be sufficient to and will furnish pure water from Lake Michigan at the ratio of twenty cubic feet to one cubic foot of the liquid sewage of every description furnished or to be furnished from the Chicago River and the Sanitary District aforesaid. That by the terms of the organic act creating the said Sanitary District of Chicago, Defendant was fully empowered and enjoined to do and perform all the acts, and make and construct all the improvements, channels, and outlets that it has constructed, at a cost to the Sanitary District of Chicago of over thirty-three million dollars.

And this Defendant, as to so much of said Bill as alleges that it, "Without any legal authority so to do, has already in part effected its said threat and purpose, and threatens to permit and to cause said sewage and filth, by artificial means of pumping and otherwise, to flow through the said channel or drain towards and into the said Des Plaines River, and eventually into the Mississippi River," answering, says: That all of its acts and doings hereinbefore and in said Bill set forth, have been done in pursuance of the powers given in and the duties devolved upon it by the said act of May 29, 1889. That

after having prosecuted its said work from the beginning continuously as aforesaid until the 27th day of May, 1897, a certain joint resolution was adopted by the Legislature of the State of Illinois which, among other things, recited as follows:

"Whereas, the General Assembly in 1889 passed an act to create sanitary districts, and provided thereunder for the disposal of the sewage of the City of Chicago, through the Des Plaines and Illinois Rivers, by means of a canal across the Chicago divide, of such capacity as to dilute the sewage beyond offence, and such sewage disposal was granted on the condition that said channel should be so constructed as to form part of a navigable waterway between Lake Michigan and the Mississippi River. * * *

"And whereas, under the legislation aforesaid and acts supplemental thereto, the works of the Sanitary District of Chicago are so far advanced that the water will be turned through the same in the year 1899.

"Therefore, be it resolved, First; That it is the policy of the State of Illinois to procure the construction of a waterway of the greatest practicable depth and usefulness for navigation from Lake Michigan, by way of the Des Plaines and Illinois Rivers to the lower Mississippi River, &c., &c." Which said joint resolution is to be found in the Session Laws of the State of Illinois for the year 1897, on page 309. By which said joint resolution the extent and progress of the said work of this Defendant was recognized and publicly declared. A copy of said joint resolution is attached to this answer as a part thereof, and marked, "Exhibit C."

That in the original act under which this Defendant was incorporated, and by Section 27 thereof, it was provided: "If any channel shall be constructed under the

provisions of Section 23, of this Act, it shall be the duty of the trustees of such district, when such channel shall be completed, and before any water or sewage shall be admitted therein, to duly notify in writing, the Governor of this State of such fact, and that the Governor shall thereupon appoint three discreet persons as commissioners, one of whom shall be a resident of the City of Joliet, or between said city and the City of La Salle, and one a resident of the City of La Salle, or between said city and the City of Peoria, and one a resident of the City of Peoria, or between said city and the mouth of the Illinois River, to inspect said work. The said commissioners shall, within ten days after such appointment, meet at the City of Chicago, and shall appoint a competent civil engineer, and they may employ such other assistants as they may require to expeditiously perform their duties. * * * And in case they shall find the work in all respects in accordance with the provisions of Section 23, of this Act, they shall so certify to the Governor, who shall thereupon authorize the water and sewage to be let into said canal."

That in pursuance of said Section the Governor of the State of Illinois, the Honorable John R. Tanner, upon notice in writing of the substantial completion of said work by said trustees, did appoint such a commission as is provided for in said Section 27. That in all respects as to personnel and locality said section was complied with by the appointment of E. S. Taylor, John Lambert and Alfred Schoch. That after such appointment the said commission went upon and examined the said channel and the said work, and thereupon, and on the 16th day of January, 1900, reported to the Governor as follows:

"Governor JOHN R. TANNER:

Your special committee reports the work of the Sanitary Trustees on the drainage channel substantially completed, and meets the requirements of the law, with the exception of the removal of the State Dams, which are in the hands of the Supreme Court. We recommend the granting of the official permit. Full official report will follow telegram. William Boldenweck, President, Board of Trustees is at St. Nicholas Hotel, Joliet.

(Signed) E. S. TAYLOR,
JOHN LAMBERT,
ALFRED SCHOCH."

That thereupon and on the 17th day of January, 1900, the said Governor authorized the opening of the said channel by the following message:

SPRINGFIELD, ILLINOIS, *January* 17, 1900.
VIA JOLIET, ILLINOIS, *January* 17, 1900.

To WILLIAM BOLDENWECK,
Lockport, Illinois.

To the BOARD OF SANITARY TRUSTEES, CHICAGO DRAINAGE DISTRICT, CHICAGO, ILLINOIS.

GENTLEMEN: The Board of Commissioners heretofore appointed by the undersigned to make an examination and survey of the Chicago River and the Chicago Drainage Channel, to determine whether the said channel has been completed in accordance with the requirements of Sec. 23, of the act entitled, "An Act to Create Sanitary Districts, and to Remove Obstructions in the Des Plaines and Illinois Rivers," approved May 29, 1889, in force July 1, 1889, having certified to me that said channel has been and is now completed in accordance with the law creating said Sanitary District. Now, therefore, I, John R. Tanner, Governor of the State of Illinois, do hereby authorize and direct you, the said Board of Sanitary Trustees, to open and let into the said channel the waters of Lake Michigan and of the Chicago River, and the sewage of the said Sanitary District, and to use and employ said channel for all

the uses and purposes for which said channel was constructed.

In witness whereof I have hereunto set my hand and seal, this 17th day of January, A. D. 1900.

JOHN R. TANNER,
Governor.

That thereupon the said Trustees, having received the said message and permit and authorization, did open the controlling works, and did permit the flow of the water of Lake Michigan and the sewage of the Sanitary District of Chicago as aforesaid into the Des Plaines River.

Wherefore, this Defendant says that in all respects it hath proceeded with full legal authority so to do.

And this Defendant, further answering, says that the distance by way of the drainage channel and the Illinois River, from Robey Street, Chicago, in the said Sanitary District, to the mouth of said Illinois River, is 322 miles. That the said Illinois River, into which the said Des Plaines River empties, is formed by the junction of the Des Plaines and the Kankakee Rivers, that the Fox River empties into the Illinois River at Ottawa, and that these three rivers uniting to form the Illinois River with their tributaries, are the natural drainage system for an area of country thickly populated and occupied by not less than a million and a half of people outside of said Sanitary District, and embracing an area of twenty-five thousand square miles. That upon the banks of said rivers, among very many smaller cities, all of them draining into the said rivers, and from thence into the Mississippi River, are the principal cities of Joliet, with a population of over 40,000, and having immense manufacturing establishments of the same nature and character as those in this Defendant's district, being the establishments of a varied industry carried on by a working population; and

the City of Aurora, with a population of 40,000, and a drainage and sewage system in all respects like that of Joliet. That these cities are respectively forty miles nearer to St. Louis by running water than is the drainage district of your Defendant. That lower down upon said Illinois River is the City of Peoria, with a population of 60,000, wherein is conducted the greatest distilling industry in the United States, together with stock-yards and cattle pens, as well as other large industries, all of which have their discharge into the said Illinois River. That the distance from the said Peoria to the mouth of the said Illinois River is about 160 miles. That in addition to the foregoing, may be mentioned the cities of Springfield, with a population of 25,000; Jacksonville, Carrolton, Beardstown, Pekin, Havana, Rushville, Mt. Sterling, Pittsfield, Lewiston and La Salle, all of which empty their sewage into the said Illinois River, by direction or indirection; and that the various sewage of this great population and these great cities is received into the said Illinois River before its junction with the Mississippi River, and that in addition thereto, as hereinbefore stated, the sewage of the Sanitary District from the same extent of territory, as is now discharging its sewage through the Sanitary District Channel, has been for the last thirty years received into said Des Plaines River, and from thence into the Illinois River.

And this Defendant, further answering, says, that in addition to the sewage and drainage carried into the Illinois River, and from thence into the Mississippi River, is the sewage and drainage of the vast territory tributary to the Mississippi River and its tributary streams. That this territory so drained is substantially all of the land of the United States between its northern border and the central line running east and west of the State of Kansas, pro-

longed eastward through the State of Missouri, and from the Rocky Mountains on the west to a line running from northeast to southwest, through the State of Illinois from the City of Chicago to the City of St. Louis, and in addition thereto, the western half of the State of Wisconsin, and the western two-thirds of the State of Minnesota. That the population of this region so drained into the Mississippi River, is in the neighborhood of fifteen million people. That an uncounted number of cities and towns, with populations ranging from two thousand to two hundred and fifty thousand, are situated upon the banks of the said Mississippi River and its tributaries, and discharge their sewage therein. That chief among these cities and towns may be mentioned Minneapolis and St. Paul in the State of Minnesota; Des Moines, Sioux City, Dubuque, Burlington, Davenport, and Keokuk, in the State of Iowa; Rock Island and Quincy in the State of Illinois; Kansas City in the State of Missouri, whose population is about 200,000, and St. Joseph, Boonville, St. Charles, and Jefferson City in said State, all of which are populous, and which discharge their sewage into the Missouri River; and Omaha and Nebraska City in the State of Nebraska That the distance from St. Paul and Minneapolis to the mouth of the Illinois River is 700 miles. That the distance from Omaha to the mouth of the Illinois River is 682.8 miles. That the distance from Kansas City to the mouth of the Illinois River is 413.7 miles. That the distance from Nebraska City to the mouth of the Illinois River is 630.7 miles. That in all these towns are carried on the industries such as are practiced by the citizens of this country, and similar in variety and character to those carried on within the district of this Defendant. That especially at Kansas City and Nebraska City and at Omaha, there are vast cattle yards, slaughter houses, rendering

establishments and other industries, such as are particularly mentioned in the Bill filed herein as being carried on within the limits of the drainage district.

And this Defendant says, that the said Mississippi River and the said Missouri River and their tributaries above the cities and towns in the State of Complainant, mentioned in said Bill, constitute the natural, uncontrollable drainage system of this whole region, this whole vast population and this whole system of industries, and that said cities and towns use the said system for their sewage from their location downward. That the additional amount of sewage which is being discharged through the drainage channel of this Defendant, if it shall not be interfered with by the order of this Honorable Court, is but trifling in amount as compared with the enormous volume of sewage received into said Mississippi River above the cities and towns in the State of Complainant, mentioned in said Bill.

And yet so it is, may it please your Honors, that by the natural law relating to sewage and drainage, and to running water in large bodies, the said sewage, instead of contributing a harmful element, is deprived of all of its deleterious qualities by processes of vaporization, attrition, lodgment, absorption, chemical conversion and bacteriologic changes, so that in the end the water purifies itself. That in addition to the foregoing, this Defendant, in pursuance of the act incorporating it, is removing from its sewage all of the solid material, and is diluting all of the liquid material by an addition thereto of twenty cubic feet of water, drawn from Lake Michigan, to every cubic foot of sewage. Wherefore, this Defendant says, that it will not, in and by the operation of its said system, contaminate, pollute, or destroy the water supply from the said Mississippi River and its tributaries, to the inhabitants, cities and towns in the State of Complainant, as in and by

said Bill declared. This Defendant attaches hereto and makes a part of this answer a certain table, which it marks "Exhibit D," of its answer, showing therein the extent and population of some of the cities and towns of the said territory now being drained and sewaged into the said Mississippi River and its tributaries, above the City of St. Louis and their respective distances from St. Louis.

This Defendant also attaches hereto A Concise Report on the Organization, Resources and Constructive Work of the Sanitary District of Chicago, which is marked Exhibit E.

And, further answering, this Defendant denies each and every other allegation of said Bill of Complaint, not herein and hereby admitted, traversed, confessed or denied; and this Defendant denies all and all manner of unlawful combination and confederacy wherewith it is by said Bill charged, without this, that there is any matter, cause or thing in Complainant's Bill of Complaint contained, material or necessary for this Defendant to make answer unto, and not herein and hereby well and sufficiently answered, confessed, traversed, and avoided or denied, is true to the knowledge or belief of this Defendant, this Defendant is ready and willing to aver and maintain and prove as this Honorable Court shall direct, and prays to be hence dismissed with its reasonable costs in that behalf most wrongfully sustained.

BERNARD A. ECKHART,
Trustee of the Sanitary District of Chicago.

THE SANITARY DISTRICT OF CHICAGO,
By CHARLES C. GILBERT,
SAMUEL M. BURDETT,
Attorneys for the Sanitary District of Chicago.

WILLIAM M. SPRINGER,
Of Counsel.

UNITED STATES OF AMERICA,
In the
Supreme Court of the United States.

On this 13th day of March, 1900, before me, S. W. Burnham, Clerk of the Circuit Court of the United States for the Northern District of Illinois, personally appeared B. A. Eckhart, one of the Trustees of the Sanitary District of Chicago, one of the Defendants in the foregoing Bill of Complaint of the State of Missouri, against the State of Illinois and the Sanitary District of Chicago, who, being by me duly sworn, deposes and says, that he is a duly elected and qualified Trustee of the Sanitary District of Chicago, and that he is familiar with its affairs and business; that he has read the foregoing separate answer of this Defendant, the Sanitary District of Chicago, and knows the contents thereof, and that the same are true of his own knowledge, except as to the matters herein stated on information and belief, and as to those matters he verily believes them to be true.

S. W. BURNHAM,
Clerk, U. S. Circuit Court,
Northern District of Illinois.

EXHIBITS.

EXHIBIT A.

An Act to provide for the completion of the Illinois and Michigan Canal, upon the plan adopted by the State in 1836.

Whereas, it has been represented, that the City of Chicago, in order to purify or cleanse Chicago river, by drawing a sufficient quantity of water from Lake Michigan, directly through it, and through the summit division of the Illinois and Michigan Canal, would advance a sufficient amount of funds to accomplish this desirable object; and, whereas, the original plan of the said canal was to cut down the summit so as to draw a supply of water for navigation directly from Lake Michigan, which plan was abandoned, for the time being, after a large part of the work had been executed, only in consequence of the inability of the State to procure funds for its further prosecution; and, whereas, under the law creating the trust the plan of the summit division of the canal was changed, the level being raised so as to require the principal supply of water to be obtained through the Calumet feeder, subject to serious contingencies, and by pumping on to the summit with the hydraulic works at Bridgeport; now, therefore,

SECTION 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly*, That to secure the completion of the summit division of the Illinois and Michigan canal, upon the original "deep cut" plan, with such modifications and changes of line, if necessary, as will most effectually secure the thorough cleansing or purification of the Chicago river, and facilitate the execution of the work, the city of Chicago, through its constituted authorities, may at once enter into an arrangement with the board of trustees of said canal, with a view to the speedy accomplishment of the work.

SECTION 2. The canal shall not be constructed of a less capacity than the plan adopted by the canal commissioners in 1836, nor shall the work of deepening it be prosecuted so as to materially interfere with the navigation. By consent of the board of trustees, however, the navigation may be opened later and closed earlier than usual in former years, but it shall never be diminished to a less time than six months.

SECTION 3. It shall be lawful for the city of Chicago to enter upon and use any lands which may be necessary for the right of way for said canal, if the route should in any part vary from the present line of canal, and to take and use any materials, of any description, necessary for the prosecution of the work contemplated, along the line thereof; the value of the same to be determined in the mode provided by the general laws of this State.

SECTION 4. The amount expended by the city of Chicago in deepening the summit division of the canal, according to the plan adopted by the canal commissioners, in 1836, shall be a vested lien upon the Illinois and

Michigan canal and its revenues, after the payment of the present canal debt; and the net revenues of the canal shall all, thereafter, be applied to the payment of the principal and interest of the same expended in accomplishing the object of this act, until the whole amount is reimbursed to the city: *Provided*, the cost shall not exceed two and a half millions of dollars.

SECTION 5. The State of Illinois may at any time relieve this lien upon the canal and revenues, by refunding to the city of Chicago, the amount expended in making the contemplated improvement and the interest thereon.

APPROVED February 16, 1865.

Public Laws of Illinois, 1865, pp. 83-84.

EXHIBIT B.

SANITARY DISTRICTS.

AN ACT to Create Sanitary Districts and to Remove Obstructions in the Desplaines and Illinois Rivers. Approved May 29, 1889. In force July 1, 1889, and amended by an Act in force July 1, 1893. Approved May 13, 1897. In force July 1, 1897.

SECTION 1. (Incorporating Sanitary District—Question, How Submitted—Commissioners.) *Be it enacted by the People of the State of Illinois, represented in the General Assembly*, That whenever any area of contiguous territory within the limits of a single county shall contain two or more incorporated cities, towns or villages, and shall be situated that the maintenance of a common outlet for the drainage thereof will conduce to the preservation of the public health, the same may be incorporated as a sanitary district under this act, in the manner following: Any 5,000 legal voters resident within the limits of such proposed sanitary district may petition the county judge of the county in which they reside to cause the question to be submitted to the legal voters of such proposed district whether they will organize as a sanitary district under this act. Such petition shall be addressed to the county judge, and shall contain a definite description of the territory intended to be embraced in such district, and the name of such proposed sanitary district; *provided, however*, that no territory shall be included in any municipal corporation formed hereunder which is not situated within the limits of a city, incorporated town or village, or within three miles thereof, and no territory shall be included within more than one sanitary district under this act. Upon the filing of such petition in the office of the county clerk of the county in which such territory is situated it shall be the duty of the county judge to call to his assistance two judges of the circuit court and such judges shall constitute a board of commissioners which shall have power and authority to consider the boundaries of any such proposed sanitary district, whether the same shall be described in such petition or otherwise. Notice shall be given by such county judge of the time and place where such commissioners will meet, by a publication inserted in one or more daily papers published in such county, at least twenty days prior to such meeting. At such meeting the county judge shall preside, and all persons in such proposed sanitary district shall have an opportunity to be heard touching the location and boundary of such proposed district and make suggestions

regarding the same, and such commissioners, after hearing statements, evidence, and suggestions, shall fix and determine the limits and boundaries of such proposed district, and for that purpose and to that extent may offer and amend such petition. After such determination by said commissioners, or a majority of them, the county judge shall submit to the legal voters of the proposed sanitary district the question of the organization and establishment of the proposed sanitary district, as determined by said commissioners, at an election to be held on the first Tuesday after the first Monday in November thence next ensuing. Notice whereof shall be given by said commissioners, at least twenty days prior thereto, by publication in one or more daily papers published within such proposed sanitary district, such notice to specify briefly the purpose of such election, with a description of such proposed district. Each legal voter resident within such proposed sanitary district shall have the right to cast a ballot at such election, with the words thereon, "for sanitary district," or, "against sanitary district." The ballots so cast shall be received, returned, and canvassed in the same manner and by the same officers as is provided by law in the case of ballots cast for county officers. The county judge shall cause a statement of the result of such election to be spread upon the records of the county court. If a majority of the votes cast upon the question of the incorporation of the proposed sanitary district shall be in favor of the proposed sanitary district, such proposed district shall thenceforth be deemed an organized sanitary district under this act.

SECTION 2. (Judicial Notice of District Organization—Election—County Judge.) All courts in this State shall take judicial notice of the existence of all sanitary districts organized under this act. Upon the organization of any sanitary district under this act, the county judge shall call an election to elect officers and cause notice thereof to be posted or published, and perform all other acts in reference to such election in like manner as nearly as may be, as he is required to perform in reference to the election of officers in newly organized cities under the provisions of an act entitled, "An act to provide for the incorporation of cities and villages," approved April 10, 1872.

SECTION 3. (Trustees, Election and Terms of.) In each sanitary district organized under this act, there shall be elected nine Trustees who shall hold their offices for five years, and until their successors are elected and qualified, except the term of office of the first trustees elected, shall be until five years after the first Monday in December after their election. The election of trustees, after the first, shall be on the Tuesday next after the first Monday in November in every fifth year. In all elections for trustees each qualified voter may vote for as many candidates as there are trustees to be elected, or he may distribute his vote among not less than five-ninths of the candidates to be elected, giving to each of the candidates among whom he distributes the same the same number of votes or fractional parts of votes. The trustees shall choose one of their number President, and such sanitary district shall from the time of the first election held by it under this act be construed in law and equity a body corporate and politic and by the name and style of the sanitary district of ——, and by such name and style may sue and be sued, contract and be contracted with, acquire and hold real estate and personal property necessary for corporate purposes, and adopt a common seal and alter the same at pleasure.

SECTION 4. (Trustees Constitute a Board—Duties and Powers of—

Duties and Compensation of Officers—Ordinances.) The trustees elected in pursuance of the foregoing provisions of this act shall constitute a board of trustees for the district by which they are elected, which board of trustees is hereby declared to be the corporate authorities of such sanitary district, and shall exercise all the powers and manage and control all the affairs and property of such district. Said board of trustees shall have the right to elect a clerk, treasurer, chief engineer and attorney for such municipality, who shall hold their respective offices during the pleasure of the board, and who shall give such bond as may be required by said board. Said board may prescribe the duties and fix the compensation of all the officers and employes of said sanitary district; *provided, however*, that the salary of the president of said board of trustees shall in no case exceed the sum of four thousand dollars per annum; and that the salary of the other members of the board shall not exceed three thousand dollars per annum; *and, provided further*, that the amount received by any attorney shall not exceed the sum of five thousand dollars ($5,000) per annum. Said board of trustees shall have full power to pass all necessary ordinances, rules and regulations for the proper management and conduct of the business of said board of trustees and of said corporation, and for carrying into effect the objects for which such sanitary district is formed.

Section 5. (Ordinances, Making Appropriation, Publication of.) All ordinances making any appropriations shall, within one month after they have passed, be published at least once in a newspaper published in such district, or if no such newspaper of general circulation is published therein, by posting copies of the same in three public places in the district; and no such ordinance shall take effect until ten days after it is so published, and all other ordinances, orders, and resolutions shall take effect from and after their passage unless otherwise provided therein.

Section 6. (Ordinance and Resolutions—Evidence.) All ordinances, orders, and resolutions, and the date of publication thereof, may be proven by the certificate of the clerk, under the seal of the corporation, and when printed in book or pamphlet form, and purporting to be published by the board of trustees, and such book or pamphlet shall be received as evidence of the passage and legal publication of such ordinances, orders, and resolutions, as of the dates mentioned in such book or pamphlet, in all courts and places without further proof.

Section 7. (Board of Trustees, Powers of.) The board of trustees of any sanitary district organized under this act shall have power to provide for the drainage of such district by laying out, establishing, constructing, and maintaining one or more main channels, drains, ditches, and outlets for carrying off and disposing of the drainage (including the sewage) of such district, together with such adjuncts and additions thereto as may be necessary or proper to cause such channels or outlets to accomplish the end for which they are designed in a satisfactory manner; also to make and establish dock adjacent to any navigable channel made under the provisions hereof for drainage purposes, and to lease, manage, and control such docks, and also to control and dispose of any water-power which may be incidentally created in the construction and use of said channels or outlets, but in no case shall said board have any power to control water after it passes beyond its channel, waterways, races, or structures into a river or natural waterway or channel, or water-power or docks situated on such river or natural waterway or channel; *provided,*

however, nothing in this act shall be construed to abridge or prevent the State from hereafter acquiring a portion of the funds derived from such water-power, dockage, or wharfage to be paid into the State treasury to be used for State purposes. Such channels or outlets may extend outside of the territory included within such sanitary district and the rights and powers of said board of trustees over the portion of such channel or outlet lying outside of such district shall be the same as those vested in said board over that portion of such channels or outlets within the said district.

SECTION 8. (May Purchase and Sell Real Estate, etc.) Such sanitary district may acquire by purchase, condemnation, or otherwise, any and all real and personal property, right of way and privilege, either within or without its corporate limits, that may be required for its corporate purposes; *provided*, all moneys for the purchase and condemnation of any property shall be paid before possession is taken, or any work done on the premises damaged by the construction of such channel or outlet, and in case of an appeal from the county court taken by either party, whereby the amount of damages is not finally determined, the amount of judgment in such court shall be deposited at some bank, to be designated by the judge thereof, subject to the payment of such damages on orders signed by such county judge, whenever the amount of damages is finally determined; and when not longer required for such purposes to sell, convey, vacate and release the same, subject to the reservation contained in Section 7, relating to water-powers and docks.

SECTION 9. (May Borrow Money—Limitation.) The corporation may borrow money for corporate purposes, and may issue bonds therefor, but shall not become indebted in any manner, or for any purpose, to an amount in the aggregate to exceed five per centum of the valuation of taxable property therein, to be ascertained by the last assessment for State and county taxes previous to the incurring of such indebtedness; *provided, however*, that said five per centum shall not exceed the sum of fifteen million ($15,000,000) dollars.

SECTION 10. (To Provide for Direct Annual Tax—Net Earnings.) At the time or before incurring any indebtedness, the board of trustees shall provide for the collection of a direct annual tax sufficient to pay the interest on such debt as it falls due, and also to pay and discharge the principal thereof as the same shall fall due, and at least within twenty years from the time of contracting the same; *provided*, that the net earnings from water-power and docks may be appropriated and applied to the purpose of paying the interest or principal of such indebtedness, or both, and to the extent that they will suffice the direct tax may be remitted.

SECTION 11. (Contracts—How Let—Eight Hours a Day's Work.) All contracts for work to be done by such municipality, the expense of which will exceed five hundred dollars, shall be let to the lowest responsible bidder therefor, upon not less than sixty days' public notice of the terms and conditions upon which the contract is to be let having been given by publication in a newspaper of general circulation published in said district, and the said board shall have the power and authority to reject any and all bids, and re-advertise; *provided*, no person shall be employed on said work unless he be a citizen of the United States, or has in good faith declared his intentions to become such citizen. In all cases where an alien, after filing his declaration of intention to become a citizen of the United States, shall, for the space of three months after he could

lawfully do so, fail to take out his final papers and complete his citizenship, such failure shall be *prima facie* evidence that his declaration of intentions was not made in good faith. And that eight hours shall constitute a day's work. The courts cannot control and determine a question vested by statute in a municipal body. The courts, in the absence of fraud, cannot by mandamus or mandatory injunction restrain a municipal board from entering into such a contract for public work as it may award to the bidder.

SECTION 12. (Trustees May Levy and Collect Taxes—Movable Bridges.) The board of trustees may levy and collect taxes for corporate purposes upon property within the territorial limits of such sanitary district, the aggregate amount of which for each of the years 1895, 1896, 1897, 1898, and 1899, shall not exceed one and one-half per centum of the value of the taxable property within the corporate limits, as the same shall be assessed and equalized for the state and county taxes of the year in which the levy is made, and the aggregate amount of which in any one year after the year 1899 shall not exceed one-half of one per centum of such value. Said board shall cause the amount required to be raised by taxation in each year to be certified to the county clerk on or before the second Tuesday in August, as provided in section one hundred and twenty-two of the general revenue law. All taxes so levied and certified shall be collected and enforced in the same manner and by the same officers as state and county taxes, and shall be paid over by the officer collecting the same to the treasurer of the sanitary district in the manner and at the time provided by the general revenue law; *provided*, that no part of the taxes hereby authorized shall be used by such drainage district for the construction of permanent, fixed, immovable bridges across any channel constructed under the provisions of this act; and, *provided further*, that all bridges built across such channel shall not necessarily interfere with or obstruct the navigation of such channel, when the same becomes a navigable stream, as provided in Section 24 of this act, but such bridges shall be so constructed that they can be raised, swung, or moved out of the way of vessels, tugs, boats, or other water crafts navigating such channel; and, *provided further*, that nothing in this act shall be so construed as to compel said district to maintain or operate said bridges, as movable bridges, for a period of seven years from and after the time when the water has been turned into said channel pursuant to law, unless the needs of general navigation on the Desplaines and the Illinois rivers, when connected with said channel, sooner require it.

SECTION 13. (Expenses of Improvement—Special Assessments—General Tax.) The board of trustees shall have power to defray the expense of any improvement made by it in the execution of the powers hereby granted to such incorporation, by special assessment or by general taxation, or partly by special assessment and partly by general taxation, as they shall by ordinance prescribe. It shall constitute no objection to any special assessment, that the improvement for which the same is levied is partly outside the limits of such incorporation, but no special assessment shall be made upon property situated outside of such sanitary district, and in no case shall any property be assessed more than it will be benefited by the improvement for which the assessment is levied. The proceedings for making, levying, collecting and enforcing of any special assessment, levied hereunder, shall be the same as nearly as may be as is prescribed by article nine of an act entitled "An act to provide for the incorpora-

tion of cities and villages," approved April 10, 1873. Whenever in said act the words "city council" are used, the same shall apply to the board of trustees constituted by this act, and the words applying to the city or its officers in that article shall be held to apply to the corporation hereby created and to its officers.

SECTION 14. (Assessment Installments—Interest.) When any assessment is made under this act, the ordinance authorizing such assessment may provide that it be divided into equal annual installments, not more than twenty in number, and fix the amount and time of payment of each installment, and that the installment shall bear interest at a rate not exceeding six per cent. per annum, payable annually, from the date fixed in said ordinance, and the several installments and interest thereon may be collected and enforced, as they shall become due, in the manner provided for the enforcement of assessments under said article nine. No more of any assessment need be returned or certified to the county collector than will show the amount due and unpaid at the time of such return, and no sale of any parcel of land for any installment of an assessment shall discharge the premises from any subsequent installment of the same or any other assessment. Any one or all of the installments may be paid any time after the assessment is confirmed, with accrued interest, if any, to the date of payment.

SECTION 15. (When Assessments Payable by Installments—Bonds May be Issued.) Where any assessment is made payable in installments the board of trustees may issue bonds or certificates not exceeding in amount eighty per centum of the unpaid portion of such assessment at the date of the issue thereof, payable only out of such assessment, and bearing interest at a rate not exceeding the rate of interest upon the installments of such assessments. The board of trustees shall have the right to call in and pay off said bonds or certificates as fast as there is money received into the treasury from the assessment against which the same are issued, and all moneys received upon such assessment shall be applied to the payment of said certificates or bonds until they are fully satisfied.

SECTION 16. (Private Property—How Taken for Improvement.) Whenever the board of trustees of any sanitary district shall pass an ordinance for the making of any improvement which such district is authorized to make, the making of which will require that private property should be taken or damaged, such district may cause compensation therefor to be ascertained, and condemned and acquire possession thereof in the same manner as nearly as may be as is provided in an act entitled, "An act to provide for the exercise of the right of eminent domain," approved April 10, 1872; *provided, however*, that proceedings to ascertain the compensation to be paid for taking or damaging private property shall in all cases be instituted in the county where the property sought to be taken or damaged is situated; *and, provided*, that all damages to property, whether determined by agreement or by final judgment of court, shall be paid out of the annual district tax, prior to the payment of any other debt or obligation. The present value of land condemned is the proper measure of damages for its condemnation, but possible increase on account of proposed improvement cannot be considered.

SECTION 17. (May Acquire Right of Way.) When it shall be necessary in making any improvements, which any district is authorized by this act to make, to enter upon any public property, or property held for public use, such district shall have the power so to do and may acquire the necessary right of way over such property held for public use in the

same manner as is above provided for acquiring private property, and may enter upon, use, widen, deepen, and improve any navigable or other waters, water-ways, canal, or lake; *provided*, the public use thereof shall not be unnecessarily interrupted or interfered with, and that the same shall be restored to its former usefulness as soon as practicable; *provided, however*, that no such district shall occupy any portion of the Illinois and Michigan Canal outside of the limits of the county in which such district is situated for the site of any such improvement, except to cross the same, and then only in such a way as not to impair the usefulness of said canal, or to the injury of the right of the state therein, and only under the direction and supervision of the canal commissioners; *and, provided further*, that no district shall be required to make any compensation for the use of so much of said canal as lies within the limits of the county in which said district is situated, except for transportation purposes.

SECTION 18. (Special Aasessment—Damage to Property, and Cost of Acquiring.) In making any special assessment for any improvement which requires the taking or damaging of property, the cost of acquiring the right to damage or take such property may be estimated and included in the assessment as a part of the cost of making such improvement.

SECTION 19. (Liability of Sanitary District for Damages.) Every sanitary district shall be liable for all damages to real estate within or without such district which shall be overflowed or otherwise damaged by reason of the construction, enlargement, or use of any channel, ditch, drain, outlet, or other improvement under the provisions of this act; and actions to recover such damages may be brought in the county where such real estate is situate, or in the county where such sanitary district is located, at the option of the party claiming to be injured. And in case judgment is rendered against such district for damages the plaintiff shall also recover his reasonable attorney's fees, to be taxed as costs of suit: *provided, however*, that it shall appear on the trial that the plaintiff notified the trustees of such district, stating that he claims damages to the amount of . . . . . dollars, by reason of (here insert the cause of damage) and intends to sue for the same; *and provided further*, that the amount recovered shall be larger than the amount offered by said trustees (if anything) as a compromise for damages sustained.

SECTION 20. (Capacity of Channel or Outlet). Any channel or outlet constructed under the provisions of this act, which shall cause the discharge of sewage into or through any river or stream of water beyond or without the limits of the district constructing the same, shall be of sufficient size and capacity to produce a continuous flow of water of at least two hundred cubic feet per minute for each one thousand of the population of the district drained thereby, and the same shall be kept and maintained of such size and in such condition that the water thereof shall be neither offensive nor injurious to the health of any of the people of this state, and before any sewage shall be discharged into such channel or outlet all garbage, dead animals, and parts thereof, and other solids, shall be taken therefrom, and any such channel or channels, turn into such channel or channels not less than 20,000 cubic feet of water per minute for every 100,000 inhabitants of said district, and shall thereafter maintain the flow of such quantity of water.

SECTION 21. (Sanitary District—Failure to Comply with Act—Remedy—Penalty.) In case any sanitary district in this State formed under the provisions of this act, shall introduce sewage into any river or stream of water, or natural or artificial water course, beyond or without the limits

of such district, without conforming to the provisions of this act, or having introduced such sewage into such water course, shall fail to comply with any of the provisions of this act, an action to enforce compliance shall be brought by the attorney general of this state in the courts of any county wherein such water course is situated, or he may authorize the state's attorney of any such county to commence and prosecute such action in any such county; *provided*, that nothing in this section contained shall be construed to prevent the prosecution of any action or proceeding by individuals or bodies corporate or politic against such district; *and provided further*, that if any individual or the authorities of any municipal corporation shall file with the attorney general a verified statement, in writing, setting forth wherein said sanitary district has failed to comply with any of the provisions of this act, it shall be the duty of the attorney general forthwith to file in the supreme court of this state a petition for mandamus, setting forth wherein said sanitary district has failed to comply with the provisions of this act, and said court shall thereupon hear and determine said cause and proceed to enforce compliance with the provisions of this act, as in other cases of mandamus.

And in order to comply with the provisions of this act, such sanitary district is hereby authorized and empowered to levy and collect such tax, as an emergency tax, upon the taxable property of such sanitary district as may be necessary to carry into effect any order, judgment or decree of said court relating to the requisite flowage of water, capacity of the channel or outlet and the construction, maintenance and operation of movable bridges, as required by this act.

SECTION 22. (Act—How Construed.) Nothing in this act contained shall be so construed as to constitute a contract or grant between the State of Illinois and any sanitary district formed under its provisions, or to prevent, debar or deprive the State of Illinois from, at any time in the future, altering, amending or repealing this act, or imposing any conditions, restrictions or requirements other, different or additional to any herein contained upon any sanitary district which may be formed hereunder.

SECTION 23. (Channel—How to be Constructed.) If any channel is constructed under the provisions hereof by means of which any of the waters of Lake Michigan shall be caused to pass into the Desplaines and Illinois Rivers, such channel shall be constructed of sufficient size and capacity to produce and maintain at all times a continuous flow of not less than 300,000 cubic feet of water per minute, and to be of a depth not less than fourteen feet, and a current not exceeding three miles per hour, and if any portion of any such channel shall be cut through a territory with a rocky stratum where such rocky stratum is above a grade sufficient to produce a depth of water from Lake Michigan of not less than eighteen feet, such portion of said channel shall have double the flowing capacity above provided for, and a width of not less than one hundred and sixty feet at the bottom capable of producing a depth of not less than eighteen feet of water. If the population of the district draining into such channel shall at any time exceed 1,500,000 such channel shall be made and kept of such size and in such condition that it will produce and maintain at all times a continuous flow of not less 20,000 cubic feet of water per minute for each 100,000 of the population of such district, at a current of not more than three miles per hour, and if at any time the general government shall improve the Desplaines or Illinois Rivers, so that the same shall be capable of receiving a flow of 600,000 cubic feet of water per

minute, or more, from said channel, and shall provide for the payment of all damages which any extra flow above 300,000 cubic feet of water per minute from said channel may cause to private property therefrom, then such sanitary district shall, within one year thereafter, enlarge the entire channel leading into said Desplaines or Illinois Rivers from said district to a sufficient size and capacity to produce and maintain a continuous flow throughout the same of not less than 600,000 cubic feet of water per minute, with a current of not more than three miles per hour, and such a channel shall be constructed upon such grade as to be capable of producing a depth of water of not less than eighteen feet throughout said channel, and shall have a width of not less than one hundred and sixty feet at the bottom; in case a channel is constructed in the Desplaines River, as contemplated in this section, it shall be carried down the slope between Lockport and Joliet to the pool, commonly known as the upper basin, of sufficient width and depth to carry off the water the channel shall bring down from above. The district constructing a channel to carry water from Lake Michigan of any amount authorized by this act, may correct, modify and remove obstructions in the Desplaines and Illinois Rivers wherever it shall be necessary so to do to prevent overflow or damage along said river, and shall remove the dams at Henry and Copperas Creek in the Illinois River, before any water shall be turned into the said channel. And the canal commissioners if they shall find at any time that an additional supply of water has been added to either of said rivers, by any drainage district or districts, to maintain a depth of not less than six feet from any dam owned by the state, to and into the first lock of the Illinois and Michigan Canal at La Salle, without the aid of any such dam, at low water, then it shall be the duty of said canal commissioners to cause such dam or dams to be removed. *This act shall not be construed to authorize the injury or destruction of existing water-power rights.*

SECTION 24. (Channel—When Completed—Control of.) When such channel shall be completed, and the water turned therein, to the amount of three hundred thousand cubic feet of water per minute, the same is hereby declared a navigable stream, and whenever the general government shall improve the Desplaines and Illinois Rivers for navigation, to connect with this channel, said general government shall have full control over the same for navigation purposes, but not to interfere with its control for sanitary or drainage purposes.

SECTION 25. (May Permit Territories Outside to Drain, Etc.) Any district formed hereunder shall have the right to permit territory lying outside its limits and within the same county to drain into and use any channel or drain made by it, upon such payments, terms and conditions as may be mutually agreed upon, and any district formed hereunder is hereby given full power and authority to contract for the right to use any drain or channel which may be made by any other sanitary district, upon such terms as may be mutually agreed upon, and to raise the money called for by such contract in the same way and to the same extent as such district is authorized to raise money for any other corporate purposes; *provided*, that where the united flow of any sanitary districts thus co-operating shall pass into any channel constructed within the limits of the county wherein such districts are located, and which passes into the Desplaines or Illinois Rivers, such united flow shall in no case and at no time be less than 20,000 cubic feet of water per minute for each one hundred thousand of the aggregate of the population of

the districts co-operating; *provided*, nothing in this act shall in any wise be so construed as to diminish, impair or remove any right or rights of any city, village, township or corporation, body politic, or individual, situated on the Desplaines or Illinois Rivers, or their tributaries, and within the valleys of the same, to use the channel for drainage or otherwise, not inconsistent with the rights of the district constructing the same, as expressed in this act.

SECTION 26. (When City or Village owns Waterworks, etc.) Whenever in any such sanitary district there shall be a city, incorporated town or village which owns a system of waterworks and supplies water from a lake or other source which will be saved and preserved from sewage pollution, by the construction of the main channel, drain, ditch or outlet herein provided for, and the turning of the sewage of such city and district therein, and there shall be in such sanitary district any territory bordering on any such city, incorporated town or village within the limits of another city, incorporated town or village, which does not own any system of waterworks, at the time of the creation of such sanitary district, then upon application by the corporate authorities of such latter named city, incorporated town or village, the corporate authorities of such city, incorporated town or village having such system of waterworks shall furnish water at the boundary line between such municipalities by means of its waterworks to the corporate authorities asking for the same in such quantities as may be required to supply consumers within said territory, at no greater price or charge than it charges and collects of consumers, within its limits for water furnished through meters in like large quantities.

SECTION 27. (When Channel Constructed—Commissioners to be Appointed to Inspect Its Works.) If any channel shall be constructed under the provisions of Section 23 of this act, it shall be the duty of the trustees of such district, when such channel shall be completed, and before any water or sewage shall be admitted therein, to duly notify, in writing, the Governor of this state of such fact; and the Governor shall thereupon appoint three discreet persons as commissioners, one of whom shall be a resident of the City of Joliet, or between said city and the City of La Salle, and one a resident of the City of La Salle, or between said city and the City of Peoria, and one a resident of the City of Peoria, or between said city and the mouth of the Illinois River, to inspect said work. The said commissioners shall, within ten days after such appointment, meet at the City of Chicago, and shall appoint a competent civil engineer, and they may employ such other assistance as they may require to expeditiously perform their duties. The said commission shall take as their datum line for the survey the datum established by the Illinois and Michigan Canal Trustees in 1847, and shall make such examination and surveys of Chicago River and of the channel or channels authorized by this act as shall enable them to ascertain whether said channel is of the character and capacity required by this act. And in case they shall find the work in all respects in accordance with the provisions of Section 23 of this act, they shall so certify to the Governor, who shall thereupon authorize the water and sewage to be let into said channel. But in case said commissioners shall find said channel is not constructed in accordance with the provisions of this act, it shall be their duty to file in any court of competent jurisdiction, on the chancery side thereof, in their name as such commissioners, a bill against said corporation, which bill shall set forth wherein said work is deficient and fails to comply with the

provisions of this act; and said court shall thereupon issue an injunction without bond against said defendants enjoining and restraining it from admitting water or sewage into said channel until the final order of the court. And in case said court, upon hearing, shall determine that said channel is not constructed in accordance with the provisions of this act, said injunction shall be continued until the provisions of this act shall have been fully complied with.

Such commissioners and engineer shall receive for their services ten dollars per day each, and their reasonable expenses and outlays for the time by them necessarily employed in the discharge of their duties, which shall be paid to them by the State Treasury; and the said sanitary district shall reimburse the state for all expenses and disbursements on account of said commission.

If any channel is constructed under the provisions of this act which shall discharge the sewage of a population of more than 300,000 into or through any river beyond or without the limits of the district constructing it, the same shall be constructed in accordance with the provisions of Section 23 of this act, and if any such channel receives its supply of water from any river or channel connecting with Lake Michigan, it shall be construed as receiving its supply of waters from Lake Michigan.

"EXHIBIT C."

Construction of Waterways.

Whereas, the General Assembly in 1869 passed "An act to create sanitary districts" and provided thereunder for the disposal of the sewage of the city of Chicago through the Desplaines and Illinois rivers by means of a canal across the Chicago Divide of such capacity as to dilute the sewage beyond offense, and such sewage disposal was granted on the condition that said channel should be so constructed as to form part of a navigable waterway between Lake Michigan and the Mississippi river, and on the theory that to produce a waterway of magnitude, as demanded by modern conditions, required a large and constant volume of water flowing through the Illinois river; and further, it was provided that the State dams at Henry and Copperas creek should be removed before the said waters should be turned through the said canal, and the United States was requested by joint resolution to stop work on the locks and dams at La Grange and at Kampsville, and to enter upon the improvement of the channel from La Salle to the mouth of the said Illinois river, and to develop progressively all the depth practicable by the aid of a large water supply from Lake Michigan; and

Whereas, Under the legislation aforesaid and acts supplemental thereto, the works of the sanitary district of Chicago are so far advanced that the water will be turned through the same in the year 1899, and the General Government, regardless of the wishes of the people of this State and of those most immediately concerned, has completed the locks and dams at La Grange and at Kampsville; and it is the experience of those familiar with the Illinois river that the dams therein below La Salle have produced a deterioration of the channel and an increase of overflow, and that they should be removed for the sanitary and agricultural benefit of the Illinois Valley, and, furthermore, that said dams will be unnecessary for navigation and a further menace to the valley on the turning therein of the volume of water proposed from Lake Michigan at Chicago; and,

Whereas, The construction of the Sanitary Canal of Chicago, and the large volume of water required to flow through the same will bring lake and river navigation, which are now 320 miles apart, within sixty miles of each other, and the development of the intermediate section between Lockport and Utica will furnish a through route from the Great Lakes to the Lower Mississippi by way of the Lower Illinois river, and to the upper Mississippi by way of the Hennepin Canal; and further, that the proportion of three routes constructed by the Sanitary District of Chicago will exceed the cost of extending the largest useful navigation by way of the Illinois river to the Lower Mississippi, together with that of the Hennepin Canal to the Upper Mississippi; and

Whereas, We believe the making of a deep waterway of the Illinois river, to be an undertaking which is national in its character, and should be accomplished by the General Government, for the general welfare, the inland and maritime commerce of the nation, and for the nation's defense in time of war; therefore, be it

Resolved, by the Senate, the House of Representatives concurring therein:

1. That it is the policy of the State of Illinois to procure construction of a waterway of the greatest practicable depth and usefulness for navigation from Lake Michigan by way of the Desplaines and Illinois rivers to the Lower Mississippi river, and by way of the Hennepin Canal to the Upper Mississippi river, and to encourage the construction of useful feeders thereto.

2. That the locks and dams on the Illinois river at La Grange and at Kampsville are detrimental to the sanitary and agricultural welfare of Illinois Valley, and form no part of a proper development in the interests of navigation and should be removed whenever the supply of water as required by is turned into the said river by means of the Sanitary Canal of Chicago; and said district has removed the dams at Henry and Copperas creek; and the United States is hereby respectfully requested to remove the said dams and to enter upon the improvement of the alluvial portion of the Illinois river by means of a system of channel improvement so as to fully utilize the flow of water from Lake Michigan.

3. That the rockbound section of the Desplaines and Illinois rivers from the end of the Sanitary Canal of Chicago, to Lockport, to the head of the alluvial river at Utica, should be developed for a navigable depth of not less than fourteen feet, and that the United States is requested to enter upon this work in co-operation with all lawful agencies provided for in this State and in harmony with the policy herein set forth.

4. That we demand the immediate removal of all dams constructed by the Government across the Illinois river whether the channel of the river is deepened or not, and our Senators and Representatives in the United States Congress are hereby earnestly requested to use their influence in favor of the removal of such dams at the earliest practical moment.

Adopted by the Senate May 27, 1897.

Concurred in by the House of Representatives, 1897.

EXHIBIT D.

Table showing population (Census 1890) and miles distant from St. Louis of the various towns and cities discharging their sewage and drainage into the Mississippi River and tributaries above St. Louis, Missouri.

Name of city.	State.	Population 1890, unless otherwise stated.	Miles distant from St. Louis, Mo.
Aurora	Illinois	19,668	250
Alton	"	10,294	20
Aledo	"	1,601	225
Amboy	"	2,657	330
Batavia	"	3,641	300
Beardston	"	4,226	110
Belvidere	"	3,867	365
Bloomington	"	20,464	190
Bushnell	"	2,314	150
Chillicothe	"	1,632	195
Carlinville	"	3,296	90
Carrolton	"	2,256	75
Clinton	"	2,598	200
Dundee	"	2,023	315
Dixon	"	5,161	330
Decatur	"	16,841	210
De Kalb	"	2,579	375
Elgin	"	17,623	300
Earlville	"	1,056	270
East Dubuque	"	1,069	345
Elmwood	"	1,546	180
El Paso	"	1,353	225
Freeport	"	10,189	405
Fulton	"	2,099	300
Geneva	"	1,692	265
Galena	"	5,635	340
Grafton	"	936	35
Galesburg	"	15,264	235
Galva	"	2,409	280
Genesee	"	3,132	285
Hamilton	"	1,301	150
Havana	"	1,512	210
Henry	"	574	210
Hennepin	"	1,564	300
Hinsdale	"	1,564	300
Joliet	"	23,264	310

Name of city.	State.	Population 1890, unless otherwise stated.	Miles distant from St. Louis, Mo.
Jacksonville	Illinois	12,935	105
Jerseyville	"	3,207	35
Kankakee	"	9,025	400
Campsville	"	172	60
Keithsburg	"	1,464	210
Kewannee	"	4,569	270
Knoxville	"	1,725	165
Lockport	"	2,449	320
Lemont	"	6,000	385
Lasalle	"	9,855	262
Lacon	"	1,649	200
Lewiston	"	2,166	150
Lexington	"	1,167	225
Lincoln	"	6,726	180
Morris	"	3,693	270
Momence	"	1,635	330
Morrison	"	2,068	300
Moline	"	12,000	250
Macomb	"	4,022	160
Marengo	"	1,445	—
Maywood	"	2,076	330
Mendota	"	3,542	210
Minonk	"	2,316	215
Monmouth	"	5,936	235
Mount Stirling	"	1,655	105
Ottawa	"	9,965	240
Oak Park	"	4,771	336
Oregon	"	1,566	345
Oquawka	"	1,100	200
Port Byron	"	775	270
Pekin	"	6,347	160
Peoria	"	41,024	167
Peru	"	5,530	262
Petersburg	"	2,342	142
Pittsfield	"	2,295	105
Plano	"	1,824	270
Polo	"	1,728	330
Pontiac	"	2,784	270
Princeton	"	3,396	225
Quincy	"	31,494	135
Riverside	"	1,000	228
Rockford	"	23,584	360
Rock Island	"	13,634	290
Rochelle	"	1,769	350
Rushville	"	2,031	120
St. Charles	"	1,690	290
Springfield	"	24,963	143

Name of city.	State.	Population 1890, unless otherwise stated.	Miles distant from St. Louis, Mo.
Savannah	Illinois	3,097	325
Spring Valley	"	3,887	225
Stirling	"	5,824	315
Streeter	"	11,414	256
Sycamore	"	2,967	390
Taylorsville	"	2,821	211
Upper Alton	"	1,803	30
Wilmington	"	1,675	290
Warsaw	"	2,721	160
Wheaton	"	1,622	320
Woodstock	"	1,663	400
Ackley	Iowa	1,466*	400
Burlington	"	25,246*	207
Belmond	"	1,173	428
Bellevue	"	1,533	340
Boone	"	6,345	350
Clinton	"	17,375*	300
Cedar Rapids	"	21,655*	305
Cedar Falls	"	4,306*	376
Charles City	"	4,201*	401
Council Bluffs	"	20,169*	467
Cherokee	"	3,092*	600
Dubuque	"	40,564*	363
Davenport	"	30,010*	272
Des Moines	"	56,359*	311
Emmettsburg	"	2,104*	441
Esterville	"	2,494*	454
Eldora	"	2,096*	376
Eagle Grove	"	3,006*	389
Ft. Madison	"	10,022*	185
Ft. Dodge	"	6,756*	369
Fairfield	"	4,026*	259
Guttenberg	"	1,424*	369
Glenwood	"	2,143*	465
Hamburg	"	1,905*	435
Humboldt	"	1,240*	395
Hawarden	"	1,725*	617
Iowa City	"	7,526*	178
Independence	"	5,124*	402
Iowa Falls	"	2,234*	402
Jefferson	"	2,260*	276
Keokuk	"	15,729*	170
Lansing	"	1,566*	441
Lyons	"	6,602*	311
Lake City	"	2,053*	390
McGregor	"	1,201*	415

* Census 1895

Name of city	State.	Population 1890, unless otherwise stated.	Miles distant from St. Louis, Mo.
Muscatine	Iowa	12,237*	245
Marshalltown	"	10,049*	365
Marengo	"	2,072*	311
Moingona	"	1,214	350
Manchester	"	2,663*	402
Mt. Pleasant	"	3,920*	220
Nashua	"	1,302*	402
Ottumwa	"	16,761*	236
Oscaleso	"	8,851*	268
Sioux City	"	27,371*	500
Vinton	"	3,160*	337
Waterloo	"	8,490*	363
Waverly	"	2,916	376
Wappello	"	1,290*	235
Washington	"	3,761*	248
Webster City	"	5,095*	369
Bonneville	Missouri	4,441	176
Brunswick	"	1,745	210
Bethany	"	1,105	210
Brookfield	"	4,547	250
Butler	"	2,812	290
Clarksville	"	1,186	85
Chillicothe	"	5,717	264
Carrollton	"	3,876	250
Clinton	"	4,737	250
Columbia	"	3.000	165
Excelsior Springs	"	2,034	275
Glasgow	"	1,761	195
Hannibal	"	12,857	120
Herman	"	1,410	100
Independence	"	6,380	290
Jefferson City	"	6,742	130
Kansas City	"	119,666	290
Kirksville	"	3,510	195
Louisiana	"	5,090	96
Lebanon	"	2,216	228
Lexington	"	4,527	256
Macon City	"	3,371	240
Marshall	"	4,297	208
Maryville	"	4,037	400
Mexico	"	4,789	160
Princeton	"	1,410	300
St. Joseph	"	42,324	355
St. Charles	"	6,161	35
Sedalia	"	14,068	230
Tarkio	"	1,156	410
Trenton	"	5,038	275

* Census 1895.

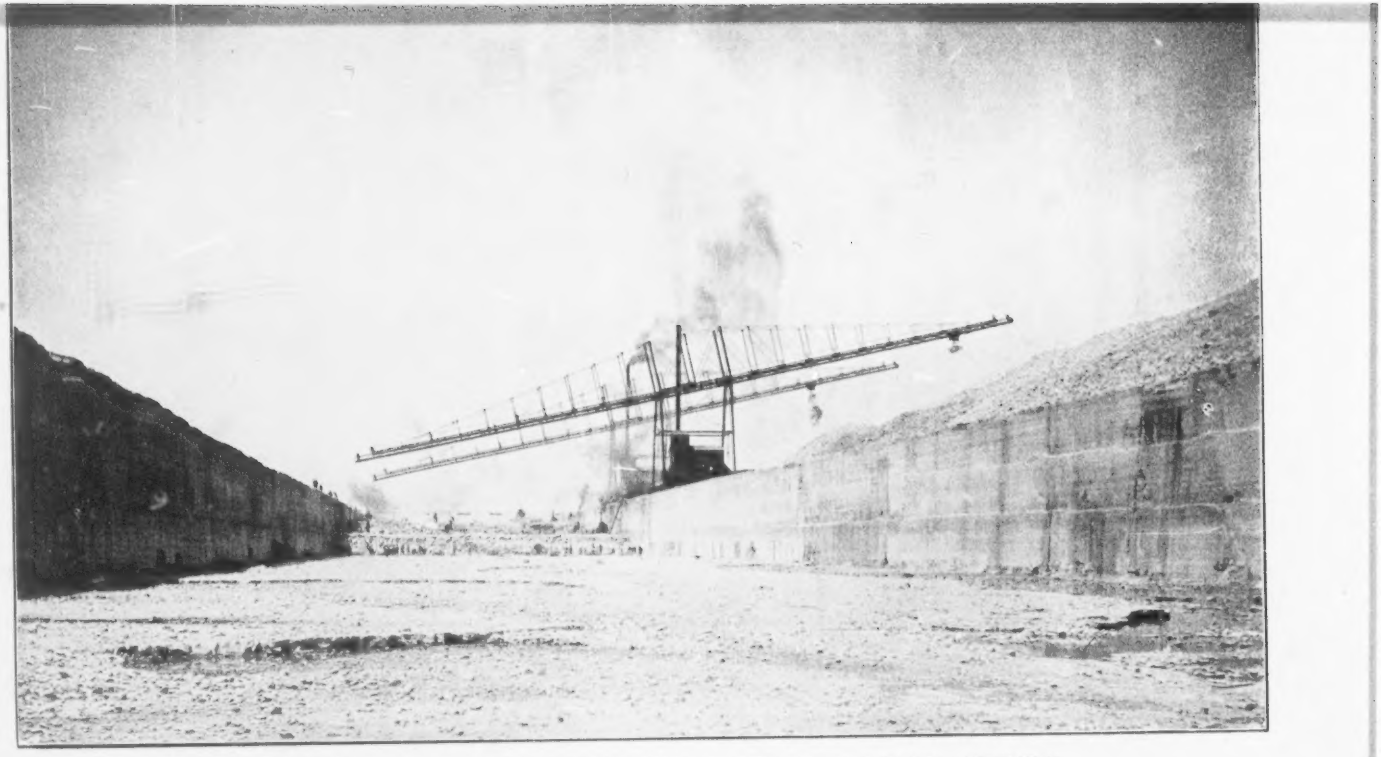
Name of city.	State.	Population 1880, unless otherwise stated.	Miles distant from St. Louis, Mo.
Argentine	Kansas	4,732	325
Atchison	"	13,963	365
Abilene	"	3,547	480
Belleville	"	1,868	520
Beloit	"	2,455	540
Clay Center	"	2,802	475
Clyde	"	1,137	500
Ellsworth	"	1,620	530
Concordia	"	3,184	510
Horton	"	3,316	310
Junction City	"	4,502	450
Kansas City	"	38,316	320
Leavenworth	"	19,768	350
Lansing	"	1,468	340
Lawrence	"	9,997	360
Maryville	"	1,913	480
Minneapolis	"	1,767	500
Manhattan	"	3,004	430
Norton	"	1,074	650
Olathe	"	3,294	360
Osborne	"	1,174	580
Ottawa	"	6,248	380
Pleasanttown	"	1,139	330
Paola	"	2,943	340
Phillipsburg	"	992	610
Salina	"	6,149	490
Seneca	"	2,032	330
Topeka	"	31,007	360
Valley Falls	"	1,180	360
La Porte	Indiana	7,126	413
Plymouth	"	2,723	410
Alma	Wisconsin	1,529	596
Black River Falls	"	2,068	596
Beloit	"	7,786	390
Baraboe	"	5,454	526
Beaver Dam	"	5,042	460
Chippewa Falls	"	9,196	576
Eau Claire	"	18,637	566
Fountain City	"	1,065	496
Grand Rapids	"	2,043	586
Hudson	"	3,338	586
Janesville	"	12,971	490
Kilbourn City	"	1,207	526
Menomonee	"	6,193	556
Merrill	"	8,607	646

Name of city.	State.	Population 1890, unless otherwise stated.	Miles distant from St. Louis, Mo.
Madison	Wisconsin	15,950	440
Marshfield	"	4,586	626
La Crosse	"	28,739	466
Nellsville	"	2,306	536
Prescott	"	966	570
Prairie du Chien	"	3,286	410
Portage	"	5,419	506
Reedsburg	"	2,116	540
Rice Lake	"	3,163	610
St. Croix Falls	"	608	610
Stevens Point	"	8,995	606
Stoughton	"	2,926	420
Tomahawk	"	2,286	670
Wausau	"	11,013	636
Anoka	Minnesota	3,812*	616
Aitkin	"	1,670*	736
Alexandria	"	2,665*	836
Austin	"	5,077*	470
Brainard	"	7,031*	725
Belle Plaine	"	1,031*	636
Blue Earth	"	2,432*	710
Faribault	"	7,616*	596
Granite Falls	"	927	756
Hastings	"	3,848*	566
Henderson	"	1,006*	636
Hutchinson	"	2,011*	670
Little Falls	"	5,116*	686
Lake City	"	2,128	536
Minneapolis	"	192,833*	602
Winona	"	29,649*	491
Mankato	"	10,173*	651
Marshall	"	1,744*	755
New Ulm	"	4,790*	690
Northfield	"	3,456*	581
St. Paul	"	140,292*	586
Red Wing	"	7,885*	560
St. Peter	"	4,251*	946
Sauk Rapids	"	1,313*	656
Stillwater	"	12,904*	588
Owatonna	"	4,891*	606
Ashland	Nebraska	1,601	560
Aurora	"	1,862	600
Beatrice	"	13,826	620
Broken Bow	"	1,647	770
Columbus	"	3,134	640

*Census 1895.

Name of city.	State.	Population, 1890, unless otherwise stated.	Miles distant from St. Louis, Mo.
Central City	Nebraska	1,368	680
Crete	"	2,310	550
Edgar	"	1,105	570
Falls City	"	2,102	465
Fremont	"	6,147	585
Fairbury	"	2,630	520
Geneva	"	1,580	570
Grand Island	"	7,536	630
Hastings	"	13,584	630
Hebron	"	1,502	530
Humboldt	"	1,114	480
Kearney	"	8,074	740
Lexington	"	1,392	775
Lincoln	"	55,154	580
McCook	"	2,345	700
Nebraska City	"	11,494	505
North Platte	"	3,055	840
Neligh	"	1,209	700
Norfolk	"	3,038	665
O'Neill	"	1,226	740
Ord	"	1,208	720
Plattsmouth	"	8,392	520
Omaha	"	140,452	560
Red Cloud	"	1,839	580
St. Paul	"	1,263	710
Schuyler	"	2,160	610
Seward	"	2,108	570
Superior	"	1,614	560
Tecumseh	"	1,554	510
Wahoo	"	2,006	590
Wayne	"	1,178	680
West Point	"	1,842	620
Wilber	"	1,226	540
Wymore	"	2,420	506
York	"	3,408	585
Huron	South Dakota	2,514*	776
Sioux Falls	"	9,002*	664
Pierre	"	1,776	922
Watertown	"	2,709*	802
Yankton	"	3,814*	655
Bismarck	North Dakota	2,186	1,030
Jamestown	"	2,296	970
Mandan	"	1,398	1,005

* Census 1895.



CHARACTERISTIC ROCK CUT.— MAIN CHANNEL, SANITARY DISTRICT OF CHICAGO.— SECTION 10.

SANITARY DISTRICT OF CHICAGO

A Concise Report on its Organization, Resources, Constructive Work, Methods and Progress

AUTHORIZED BY THE BOARD OF TRUSTEES, NOVEMBER 1, 1899

Prepared by the Chief Engineer

John F. Higgins, Printer and Binder
196 and 198 Clark Street
Chicago

BOARD OF TRUSTEES.

WILLIAM BOLDENWECK,	1370 N. Clark Street
JOSEPH C. BRADEN,	159 La Salle Street
ZINA R. CARTER,	225 W. Sixteenth Street
BERNARD A. ECKHART,	377 Carroll Avenue
ALEXANDER J. JONES,	707 Tacoma Building
THOMAS KELLY,	1411 Unity Building
JAMES P. MALLETTE,	309 Tacoma Building
THOMAS A. SMYTH,	803 Jackson Boulevard
FRANK WENTER,	475 Ashland Boulevard

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WILLIAM BOLDENWECK,	President of the Board
JOSEPH F. HAAS,	Clerk of the District
FRED M. BLOUNT,	Treasurer of the District
ISHAM RANDOLPH,	Chief Engineer of the District
CHARLES C. GILBERT,	Attorney of the District

OFFICES.

SECURITY BUILDING, CHICAGO.

COMMITTEES FOR 1898-9.

JUDICIARY.

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BERNARD A. ECKHART, ALEXANDER J. JONES,
JOSEPH C. BRADEN, THOMAS KELLY.

FINANCE.

ZINA R. CARTER, Chairman,
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ENGINEERING.

THOMAS A. SMYTH, Chairman,
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FRANK WENTER, BERNARD A. ECKHART,
JOSEPH C. BRADEN, THOMAS KELLY, THE PRESIDENT.

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BERNARD A. ECKHART, ALEXANDER J. JONES,
ZINA R. CARTER THOMAS A. SMYTH.

LABOR.

JOSEPH C. BRADEN, Chairman,
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FRANK WENTER, BERNARD A. ECKHART,

HEALTH AND PUBLIC ORDER.

THOMAS KELLY, Chairman,
ALEXANDER J. JONES, JAMES P. MALLETTE,
THOMAS A. SMYTH, ZINA R. CARTER.

RULES.

THE PRESIDENT, Chairman,
JOSEPH C. BRADEN, ALEXANDER J. JONES,
JAMES P. MALLETTE, THOMAS KELLY.

REGULAR MEETINGS.

The Board of Trustees meets every Wednesday at 2 o'clock, P. M.

COMMITTEES ARE SUBJECT TO THE CALL OF THE CHAIRMAN.

COMPLETE LIST OF MEMBERS OF BOARD OF TRUSTEES.

JOHN J. ALTPETER	Elected December 12, 1889; served to December 2, 1895
ARNOLD P. GILMORE	Elected December 12, 1889; served to December 2, 1895
RICHARD PRENDERGAST	Elected December 12, 1889; served to December 2, 1895
WILLIAM H. RUSSELL	Elected December 12, 1889; served to December 2, 1895
FRANK WENTER	Elected December 12, 1889; served to December 2, 1895
CHRISTOPH HOTZ	Elected December 12, 1889; resigned January 16, 1892
JOHN A. KING	Elected December 12, 1889; resigned July 22, 1891
MURRY NELSON	Elected December 12, 1889; resigned June 19, 1891
HENRY J. WILLING	Elected December 12, 1889; resigned September 23, 1891
WILLIAM BOLDENWECK	Elected to fill vacancy, November 3, 1891
LYMAN E. COOLEY	Elected to fill vacancy, November 3, 1891
BERNARD A. ECKHART	Elected to fill vacancy, November 3, 1891
THOMAS KELLY	Elected to fill vacancy, November 8, 1892
WILLIAM BOLDENWECK	Re-elected November 5, 1895
JOSEPH C. BRADEN	Elected November 5, 1895
ZINA R. CARTER	Elected November 5, 1895
BERNARD A. ECKHART	Re-elected November 5, 1895
ALEXANDER J. JONES	Elected November 5, 1895
THOMAS KELLY	Re-elected November 5, 1895
JAMES P. MALLETTE	Elected November 5, 1895
THOMAS A. SMYTH	Elected November 5, 1895
FRANK WENTER	Re-elected November 5, 1895

COMPLETE LIST OF OFFICERS OF DISTRICT.

PRESIDENT

MURRY NELSON	Elected February 1, 1890; served to December 2, 1890
RICHARD PRENDERGAST	Elected December 2, 1890; served to December 8, 1891
FRANK WENTER	Elected December 8, 1891; served to December 3, 1895
BERNARD A. ECKHART	Elected December 3, 1895; served to December 8, 1896
THOMAS KELLY	Elected December 8, 1896; served to December 7, 1897
WILLIAM BOLDENWECK	Elected December 7, 1897

CLERK

AUSTIN J. DOYLE	Elected February 1, 1890; resigned June 25, 1890
THOMAS F. JUDGE	Elected July 12, 1890; resigned January 1, 1896
JAMES REDDICK	Elected January 1, 1896; resigned December 1, 1898
JOSEPH F. HAAS	Elected December 1, 1898

TREASURER

BYRON L. SMITH	Elected February 1, 1890; resigned January 15, 1892
MELVILLE E. STONE	Elected January 23, 1892; served to December 2, 1896
FRED M. BLOUNT	Elected December 2, 1896

CHIEF ENGINEER

LYMAN E. COOLEY	Elected February 1, 1890; resigned December 10, 1890
WILLIAM E. WORTHEN	Elected December 17, 1890; resigned April 21, 1891
SAMUEL G. ARTINGSTALL	Elected May 9, 1891; resigned January 16, 1892
BENEZETTE WILLIAMS	Elected January 16, 1892; resigned June 7, 1893
ISHAM RANDOLPH	Elected June 7, 1893

ATTORNEY

GEORGE W. SMITH	Elected July 12, 1890; resigned April 25, 1891
ADAMS A. GOODRICH	Elected June 13, 1891; resigned February 23, 1892
ORRIN N. CARTER	Elected February 24, 1892; resigned August 15, 1894
GEORGE E. DAWSON	Elected August 15, 1894; resigned January 1, 1896
CHARLES S. DENEEN	Elected January 1, 1896; resigned April 1, 1896
WILLARD M. McEWEN	Elected April 1, 1896; resigned February 3, 1897
FREDERICK W. C. HAYES	Elected February 3, 1897; died November 1, 1898
CHARLES C. GILBERT	Elected November 30, 1898

PREFACE

THE object to be accomplished by the work of the Sanitary District of Chicago is the reversal of the eastward flow of the Chicago River into Lake Michigan and the restoration of the ancient western discharge of the lake into the Desplaines Valley. The desired outcome of this change is the creation of a sanitary and ship canal—sanitary in that the result of the completed project will be the diversion of all the city sewage now entering the lake into the canal, thereby preserving the city's water from pollution. The ship canal is a necessary and inevitable result of the work which has created the largest artificial waterway yet constructed. The work of the Sanitary District in the Chicago River is, first, dredging from the lake to Robey Street to a uniform depth (except over tunnels) of twenty feet below the flow line. Second, constructing between Monroe and Van Buren Streets a covered conduit or by-pass through the lands of the Pennsylvania and Alton Railroad Companies. This by-pass has a section for flow of water fifty feet wide and sixteen feet deep. Third, removing two center-pier bridges—one at Taylor Street and the other the railroad bridge just south of it and building in their places bascule bridges of the rolling lift type. At Canal Street a bascule bridge will be substituted for the now existing "jack-knife" bridge.

At sundry places the river has been, or is being widened and re-docked. The result of these improvements will be an adequate provision for a flow of three hundred thousand cubic feet of water per minute. The distance from the lake via the river to Robey Street is about six miles.

I. R.

CHICAGO, NOVEMBER 1, 1899.

DESCRIPTION OF THE WORK.

The Main Drainage Channel of the Sanitary District of ago is now practically completed from its confluence with South Branch of the Chicago River, at Robey Street, in the of Chicago, to Lockport, its southern terminus, in Will nty, Illinois, a distance of 28.05 miles, as shown upon ccompanying map. At the southern end of the channel controlling works are located. Beyond these works, the ruction undertaken by the District involves the work ssary for conducting the flow from the channel, in con- ion with the waters of the Desplaines River, down the vity to and through the City of Joliet, and the making of changes in the Illinois and Michigan Canal as the new tions developed will render necessary.

The first work put under contract extended southwesterly the Willow Springs road, and these sections were num- consecutively Nos. 1 to 14. Average length of sections, one mile. Easterly from Willow Springs road the sec- are lettered from A to O, omitting J. The lettered ns are, except for a short distance near Summit, entirely acial drift, defined in the specifications thus: "Glacial shall comprise the top soil, earth, muck, sand, gravel, clay, pan, boulders, fragmentary rock displaced from its original and any other material that overlies the bed rock."

The sections from 1 to 14 were put under contract in July,

1892; those from A to F were put under contract late in 1892 and early in 1893; and those from G to M inclusive were contracted for in December, 1893. Sections N and O were put under contract May 2d, and Section 15 August 27th, 1894.

Earth was first broken on "Shovel Day," September 3, 1892, on the rock cut below Lemont.

The Desplaines Valley is traversed by the river from which it takes its name—a stream of wide fluctuations with no constant and reliable fountain supply. During some seasons its whole discharge would pass through a six-inch pipe, and at others its volume reaches 800,000 cubic feet per minute. Then it rolls majestically along, flooding the whole valley. Such being the situation, control of this stream was a condition precedent to the successful prosecution of the work upon the Main Channel. This control has been secured by the outlay of $1,000,156 in constructing what is known as the "River Diversion Channel."

About thirteen miles of new river channel had to be excavated, parallel with the location of the Main Drainage Channel, and about nineteen miles of levee built to divorce the waters of the Desplaines watershed from the channel which is to receive the waters of Lake Michigan and pass them on to the Mississippi River, via the lower Desplaines and the Illinois Rivers. The width of the River Diversion Channel on the bottom is 200 feet, side slopes one and one-half to one, grade generally 12-100 per 1,000 feet.

At the head of this River Diversion it was necessary to provide a safety valve in the form of a spillway, to allow surplus water to flow toward Chicago, because arrangements have not as yet been perfected for carrying the entire flood waters of the Desplaines through Joliet.

This spillway is a concrete dam capped with cut stone, and its wings faced with stone masonry; it is 397 feet long and its crest is 16.25 feet above Chicago datum (this datum is referred to the low water of Lake Michigan of 1847, and is 579.61 feet above sea level at Sandy Hook). No water flows over this spillway until the volume passing the water gauge above it reaches 300,000 cubic feet per minute.

The cross-section of the earth sections from A to E inclu-

ATCHISON, TOPEKA AND SANTA FE BRIDGE ON SECTION C.

sive, a distance of 5.3 miles, is 202 feet on the bottom, side slopes two to one. This section extends for about 500 feet into the west end of F and then reduces to 110 feet on the bottom, preserving the same side slopes for a distance of 3.8 miles. The explanation for this change of cross-section is as follows: Throughout the rock sections, and those sections in which there is a preponderance of hard material, or where rock may appear,

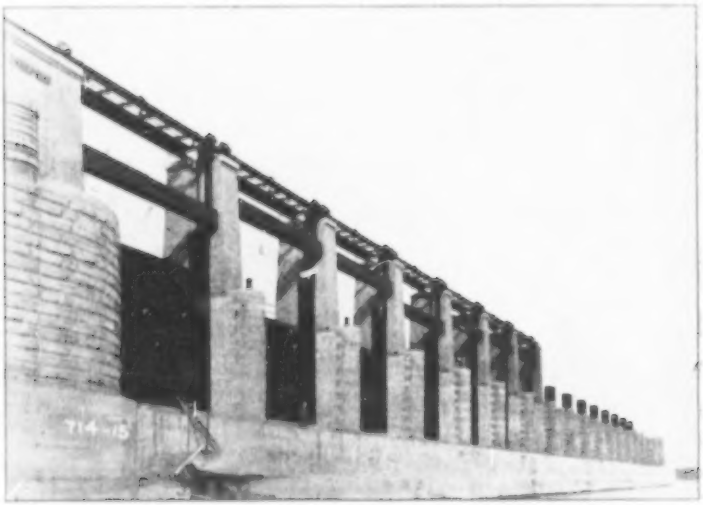
the section adopted is designed according to law for a flow of 600,000 cubic feet of water per minute, which means provision for a population of 3,000,000 people. The narrower channel provides for the flow of 300,000 cubic feet per minute, or for about the present population of Chicago. The enlargement of the narrow channel can be made by the easier methods of excavation, such as dredging, whenever the needs of the city require it. The grade throughout the lettered sections is one foot in 40,000 (.025 per 1,000 feet) and the bottom of the channel at Robey street is 24.448 feet below datum. The numbered sections, from No. 1 to No. 6, inclusive, are underlaid with solid rock. The width of the bottom, in rock, is 160 feet, and walls of masonry laid in cement have been built upon the rock surface to a height of five feet above datum. Sections 7 to 14, inclusive, are in solid rock; width at bottom 160 feet, sides vertical, prism taken out in three stopes with offsets of six inches on each side for each cut, making top width 162 feet; grade in rock one foot in 20,000 (.05 per 1,000).

Section No. 15 is also in rock and its cross-section is enlarged at its south end so as to form a "windage basin" in which large vessels may be turned around. The controlling works are located on this section. These works consist of gates or movable dams by which the flow of water from the Main Channel into the tail race, which is to deliver the outflow into the Desplaines River, can be controlled.

This river below Lockport follows the trough of the valley down a steep declivity to the canal basin in Joliet. The fluctuations in Lake Michigan, by varying height of water surface, will be felt at the controlling works, and provisions have been made to meet these fluctuations within a range of five feet above datum and eight feet below, or an extreme oscillation of

thirteen feet. The fall from datum at the controlling works to the level of the upper basin is about forty-two feet, in a distance of about four and one-third miles.

The controlling works comprise seven sluice gates of metal, with the necessary masonry bulk heads and one bear trap dam. The sluice gates may be considered as a modification of what is known as the Stoney gate type, gates having a vertical play of twenty feet and openings of thirty feet each.



CONTROLLING WORKS.—VIEW SHOWING STONEY GATES.

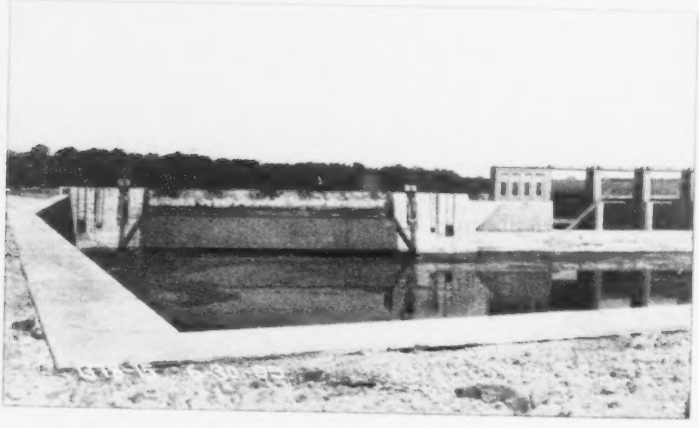
The bear trap dam has an opening of 160 feet and an oscillation of seventeen feet vertically. This dam is essentially two great metal leaves hinged together and working between masonry bulk heads. The down-stream leaf is securely hinged to a very heavy foundation, and the up-stream leaf is so placed as to present the barrier to the water. This structure is operated by

admitting water through properly constructed conduits, controlled by valves, beneath the leaves just described. To raise the crest of the dam, water is admitted from the up-stream side and the discharge shut off until the desired height is obtained, and then the valves are adjusted so that the volume of water beneath the leaves shall be constant. To lower the crest, the water beneath the leaves is drawn off until the desired height is reached, when the valves are again arranged so as to maintain a constant volume of water.

All the bridges on the Main Channel are movable structures. There are six bridges for public highways. One was built for the use of the Southwest Boulevard and Western Avenue. It has double roadways—one being for heavy and the other for light traffic. There are seven railway bridges, one being an eight-track rolling lift structure, with a channel span of one hundred and twenty feet. One is a four-track swing bridge, and the others are double-track structures. The bridges on the walled and solid rock sections of the Channel are all "bob-tailed" (or have arms of unequal length), counter-weighted structures, with pivot piers on the right bank, and long arms spanning the entire channel, thus avoiding any obstruction to the flow from center and protection piers. These bridges are of latest design, conforming to the heaviest modern specifications. The entire weight of the iron and steel used in their construction was 22,678,000 pounds.

The work of the District south of the controlling works consists of straightening, widening and deepening the Desplaines River, to give it a flowage capacity of 1,500,000 cubic feet of water per minute. This involved, in the City of Joliet, the rebuilding of Dam No. 1, the removal of Dam No. 2 (both structures belonging to the Illinois and Michigan Canal),

the removal of the Adam Dam, the rebuilding of Lock No. 5, and the removal of the Guard Lock. At Jefferson Street, the stone-arched bridge has been removed to make way for a steel bridge of greater span and width, equal to that of the street. The Cass Street bridge also gives place to a modern steel structure of greater span and width. From Lock No. 5 to Jefferson Street a massive concrete wall has been constructed to separate the Illinois and Michigan Canal from the river. At Jackson Street a great deal of costly excavation has been made



CONTROLLING WORKS.—VIEW SHOWING BEAR TRAP DAM.

to admit of an extensive water power development, which is the property of the State.

The total amount of excavation involved in the construction of the Main Channel is 28,500,000 cubic yards of glacial drift and 12,910,000 cubic yards of solid rock, or an aggregate of 41,410,000 cubic yards, to which must be added the material excavated from the River Diversion: glacial drift, 1,810,000

cubic yards; solid rock, 258,659 cubic yards; total River Diversion, 2,068,659; grand total Main Channel and River Diversion, 43,478,659 cubic yards. All of this work is now completed or under contract, and in addition thereto 380,050 cubic yards of retaining wall. The retaining wall is all laid in cement mortar. The rock when broken up expands about 80 per cent, and therefore the volume of the rock spoil banks will be nearly 22,078,000 cubic yards. The whole volume of spoil (earth and rock), if deposited in Lake Michigan in forty feet of water, would make an island one mile square, with its surface twelve feet above the water line.

The largest amount of material excavated in any one month, since the work began, was in August, 1894—1,291,688 cubic yards of glacial drift, and 413,164 cubic yards of solid rock; but the largest estimate returned was for the month of June, 1895, amounting to $742,365, representing the excavation of 959,074 cubic yards of glacial drift, 555,500 cubic yards of solid rock, and 13,799 cubic yards of masonry laid in cement.

During the month of July, 1894, 74,800 cubic yards of solid rock were removed by the contractors for Section 8, a record which, up to that period, had probably never been equaled in all the ages since man began to quarry stone; since that time, however, this remarkable feat has been eclipsed by the contractors for Section 14, who, during the month of April, 1895, excavated 86,400 cubic yards of solid rock.

DIMENSIONS AND COST OF CHANNEL.

The distance from the mouth of the Chicago River to the junction of the Main Channel with the West Fork of the South Branch at Robey Street is about six miles.

The length of the Main Channel proper, from Robey Street to the Controlling Works at Lockport, is 28.05 miles—making a total of 34.05 miles.

The dimensions of the Channel are: Robey Street to Summit, 7.8 miles; 110 feet wide at bottom; 198 feet at water line

JUNCTION OF EARTH AND ROCK SECTIONS.

with minimum depth of water, 22 feet. Summit to Willow Springs, 5.3 miles; 202 feet wide at bottom, 290 feet wide at water line, with 22 feet depth of water; grade of earth channel one foot in forty thousand feet, or $1\frac{5}{8}$ inches per mile. The side slopes in earth are one foot vertical to two feet horizontal. At Willow Springs the channel narrows to the walled and rock

cross section, extending 14.05 miles to Lockport, 160 feet wide at bottom, 162 feet at top; grade in rock one foot in twenty thousand, or 3¼ inches per mile.

The velocity in earth is figured for 1¼ miles per hour and in rock 1.9 miles per hour.

COST OF MAIN CHANNEL AND AUXILIARY WORK UNDER CONTRACT AND ESTIMATED TO JANUARY 1, 1900.

CONSTRUCTION.

Diversion of Desplaines River	$ 1,000,156	38
Main Channel, Robey Street to Lockport	18,318,609	43
Controlling Works	261,750	67
Chicago River, Dredging and By-pass	537,975	92
Desplaines River Improvement, Controlling Works to Joliet	790,126	12
Railroad and Highway Bridges	2,611,348	00
Miscellaneous	73,047	68
Contingency Fund	100,000	00
Total estimated cost of construction	$ 23,693,014	20

MISCELLANEOUS.

Capitalization of Railroad Bridges	$ 410,000	00
Right of Way	3,175,000	00
Estimated cost of Administration to January 1, 1900	2,190,000	00
Maintenance Account	96,000	00
General Account	457,000	00
Total estimated cost, exclusive of Interest Account	$ 30,021,014	20
Estimated Interest charges to January 1, 1900	3,504,677	00
Grand total	$ 33,525,691	20

EXPENDITURES TO SEPTEMBER 1, 1899.

Right of Way	$ 3,172,185 05	
Construction	21,379,675 36	
Administration, including General Account	2,550,629 49	
Interest	2,811,792 94	
Capitalization of Bridges	261,548 20	
Maintenance	87,421 30	
		$30,263,252 34
Balance required to January 1, 1900		$ 3,262,438 86

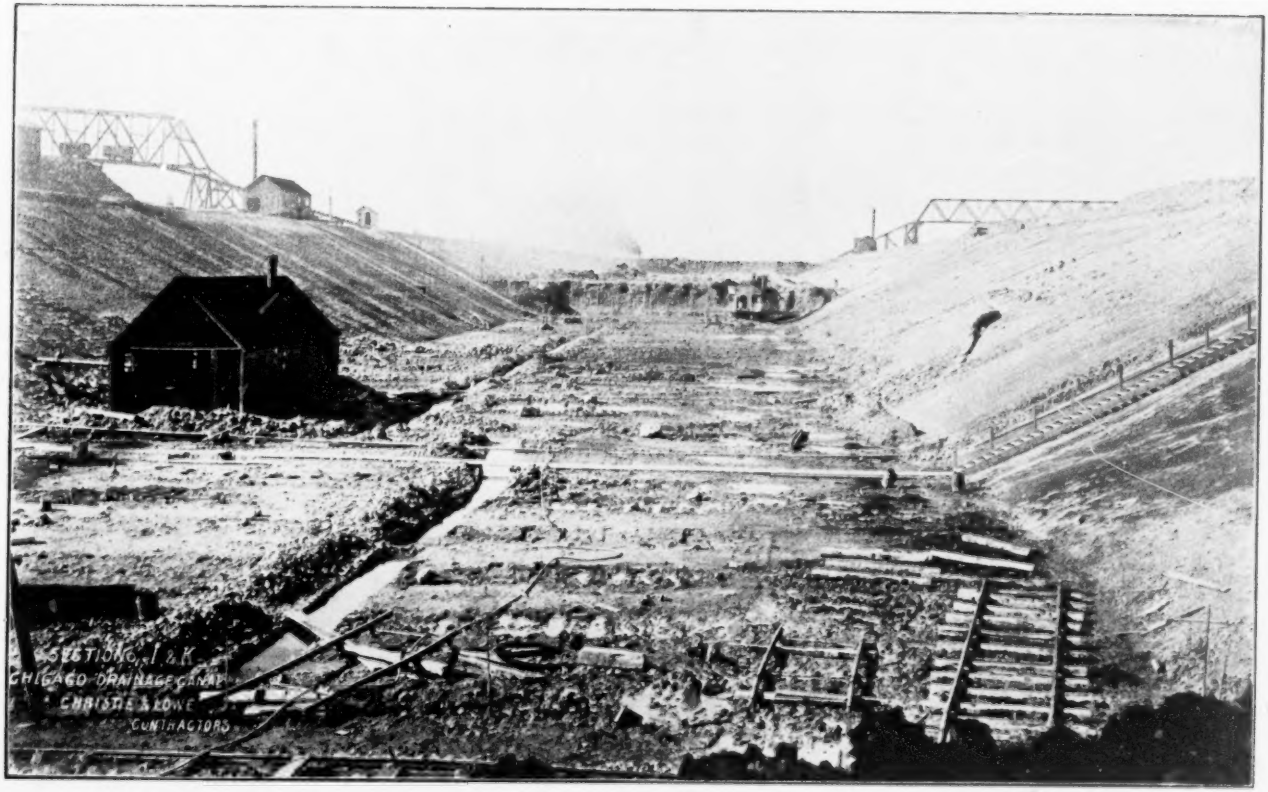
APPROXIMATE QUANTITIES INVOLVED IN WORK—CUBIC YARDS.

	Main Channel.	River Diversion.	Totals.
Glacial Drift	28,500,000	1,810,000	30,310,000
Solid Rock	12,910,000	258,659	13,168,659
Retaining Wall			380,050
Bridge Masonry			84,000
Totals	41,410,000	2,068,659	
		41,410,000	
Grand Total, Glacial Drift and Solid Rock		43,478,659	

METHODS OF WORKING.

On the earth sections some novelties were introduced. On Sections L and M, cars, specially constructed, were loaded by steam shovels and drawn by steam hoists up a steep incline to a proper height where they ran on to a tipple and were automatically dumped. Each incline was equipped with two four-yard cars, which loaded and dumped alternately. On Sections I and K, the contractors erected bridges spanning the spoil bank at proper height, their supporting piers being carried on trucks which travelled on tracks parallel with the channel. From the channel end of the bridge, an inclined track ran down into the cut. In connection with this device, two eight-yard cars were used which were successively loaded by steam shovel, drawn up the incline on to the bridge by steam hoist, and then automatically dumped and immediately returned to the pit. An output of 100 yards per hour was probably sustained by this combination of devices.

On Section H, a conveying machine designed by Messrs. Hoover & Mason, was constructed on a mammoth scale. It was essentially a bridge spanning the channel with cantilever arms projecting far enough beyond on each side to overhang the spoil area. On this structure were mounted the necessary sprocket wheels and other machinery for carrying a series of steel pans which formed the conveyor belt. The structure was 640 feet from end to end, mounted on trucks traveling upon tracks parallel with the channel, and its capacity was 500 cubic yards per hour. On Section F the material was taken from the steam shovel by cars fitted with pneumatic dumping apparatus, the power for which was supplied from the locomotive. The engineer operated these dumps just as he would apply the air brakes. Sections A, B and a portion of C are located in the old



CHARACTERISTIC EARTH CUT — MAIN CHANNEL, SANITARY DISTRICT OF CHICAGO. — SECTIONS I AND K

channel of the Desplaines River, and were overlaid with muck to a considerable depth. This muck was removed by hydraulic dredges. Each of these dredges has a capacity of about 2,500 cubic yards in ten hours, and this output in solid matter represents about eight per cent. of the capacity of the pumps. One great advantage of the hydraulic method of removal is that the material can be removed to any desired dumping ground within a distance of 3,000 feet without adding anything to the contract price of the excavation.

On those sections which are partly in earth and partly in rock, all of the usual methods of removing earth were employed, varied to suit peculiar conditions or to meet the ideas of the contractors doing the work. On Section No. 6 a large amount of muck had to be removed, and a very ingenious contractor improvised a hydraulic dredge at a very small cost, and did the work at a very moderate expense.

On the rock sections the sides were cut down vertically by channel machines, and the merits of the several devices were satisfactorily demonstrated on this work. Of course steam drills were used, and on the sections which were best planted these were worked from a central power station by compressed air. The top lifts were removed by the use of carts and tram cars, the traction for which latter was usually supplied by steam hoisting engines. The lower lifts were taken out by the use of cable-ways, high power derricks and cantilever conveyors.

The cable-ways as first constructed were not very successful, but experience gained upon this work resulted in improvements from time to time, until by the adoption of a simple improvement devised by Mr. H. C. Locher, one of the contractors, they were brought to a stage of efficiency which made them worthy competitors of the cantilever conveyors. The

high power derricks used upon two of the sections did not come up to the expectations of the builders, and their use was confined to the machines already in place. The revolving derricks on Section 14, after a great deal of costly experimentation, developed considerable merit. The cantilevers are probably the most perfect devices now known for hoisting and disposing of material from rock cuttings such as these.

The average daily output of rock for the month of June, 1895, reached 21,365 cubic yards, requiring the use of eight tons of dynamite.

The original contracts for this work called for its completion April 30, 1896; at that date Sections 8, 9, 10, 11, 12, 13 and 14 were practically done, also Sections I, K, L and M.

When finally completed, this Channel will be a free waterway, navigable for any craft drawing less than twenty-two feet of water. The cutting being made by this District constitutes nearly two-thirds of the entire cost of creating a channel from Chicago to the Mississippi, which would be navigable for the largest boats which will be able to ply between St. Louis and New Orleans, after the present plans for the improvement of the Mississippi will have been completed. The creation of such a channel seems to be inevitable; a commercial necessity sooner or later to be recognized and undertaken by the General Government, which must carry out the enterprise, if it is ever executed.

EXTENT, POWERS AND RESOURCES OF THE DISTRICT.

This Channel is being constructed under the general law for incorporating Sanitary Districts, enacted by the Legislature of the State of Illinois in 1889. The Sanitary District of Chicago comprises all of the city north of Eighty-seventh Street, together with some forty-three square miles of Cook County, outside of the city limits, which will be directly benefitted by the improvement. The population of the City of Chicago in 1890, according to the Federal census, was 1,099,850, and the equalized assessed valuation of real estate and other property subject to taxation in the Sanitary District for the year 1898, was two hundred and eighteen million two hundred and ninety-nine thousand nine hundred and seventy-seven ($218,299,977) dollars, being about one-tenth of the real value.

The Trustees are elected by popular vote and form an independent organization separate and distinct from the municipal government of Chicago. These Trustees may levy and collect taxes for carrying on the work entrusted to them to the extent of one-half of one per cent. of the value of the taxable property within the corporate limits of the District, as the same shall be assessed and equalized for State and County taxes of the year in which the levy is made, and, by an amendment, passed by the Thirty-ninth General Assembly of Illinois in 1895, this power was increased to one and one-half per cent for a period of three years, beginning with the year 1895. Subsequently, it appearing that the District would not have sufficient funds to complete the work, the Trustees procured the passage of an act by the General Assembly in 1897, extending the levy of one and one-half per cent for two years more or until and including the year 1899. They may issue bonds to

the extent of five per cent of the value of the taxable property of the District, as determined by the last assessment for State and County taxes previous to the issue of said bonds; provided, however, that said five per cent shall not exceed the sum of fifteen million (15,000,000) dollars.

Under this authority, the District has already issued $13,990,000 of bonds, all payable in currency, $8,000,000 being five per cent. bonds, $5,000,000 being four and one-half per cent. bonds, and $300,000 being three and one-half per cent. bonds, running from one year to twenty years, except the three and one-half per cent. bonds, which run for twenty years from date; of the others, one-twentieth of the issue must be paid off and retired each year, and $3,200,000 have already been retired, leaving $10,790,000 now outstanding. Additional bonds to the amount of $430,000 will be retired on January 1, 1900. These bonds have been sold at an average premium of about one and one-tenth per cent. The taxes afford a revenue sufficient to pay the interest on these bonds, to pay off and retire one-twentieth of the issue each year, and leave a surplus to apply upon the current obligations of the District incurred for construction.

TO VIEW THE WORK.

The Channel is closely paralleled by the Chicago and Alton Railroad and the Atchison, Topeka and Santa Fe Railroad, and is easily accessible from the stations of these roads between Chicago and Lockport.

All sections can be reached by their trains as follows:

Chicago & Alton Railroad, Canal and Adams Streets—"Alton" trains stop at Brighton Park, Summit, Mt. Forest, Willow Springs, Sag Bridge, Lemont and Lockport.

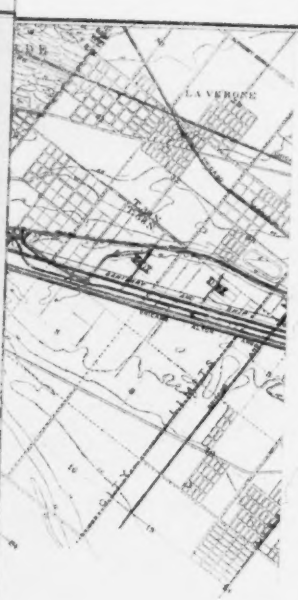
Atchison, Topeka & Santa Fe Railroad, Dearborn and Polk Streets—"Santa Fe" trains stop at Gahan & Byrne, McCook, Gary, Willow Springs, Lemont, Romeo and Lockport.

See local time cards of each road for particulars.

LIST OF CONTRACTORS ON MAIN CHAN[illegible] THE SANITARY DISTRICT OF CHICAGO.

NOVEMBER, 1899.

SEC.	MATERIAL.	CONTRACTOR.	P. O. ADDRESS.
Chicago River	Dredging	Lydon & Drews Co	1441 Unity Building, Chicago.
O	Earth	McMahon & Montgomery Co. et al.	425 N. Halsted St., Chicago.
N	Earth	Hayes Brothers et al	32d St. and Maplewood Ave., Chicago.
M	Earth	The Heidenreich Co	541 Rookery Building, Chicago.
L	Earth	The Heidenreich Co	541 Rookery Building, Chicago.
K	Earth	Christie & Lowe	512 N. Y. Life Building, Chicago.
I	Earth	Christie & Lowe	512 N. Y. Life Building, Chicago.
H	Earth	Gahan & Byrne	4209 S. Halsted St., Chicago.
G	Earth	Gahan & Byrne	4209 S. Halsted St., Chicago.
F	Earth	Gahan & Byrne	4209 S. Halsted St., Chicago.
E	Earth	Halvorson, Richards & Co	St. Paul, Minn.
D	Earth	E. D. Smith & Co	Philadelphia, Pennsylvania.
C	Earth	Western Dredging and Improvement Co	Lafayette, Indiana.
B	Earth	Heidmaier & Neu	908 Security Building, Chicago.
A	Earth	Heidmaier & Neu	908 Security Building, Chicago.
1	Earth and Rock	Griffiths & McDermott	40 Lakeside Building, Chicago.
2	Earth and Rock	McArthur Brothers	1410 Gt. Northern Bldg., Chicago.
3	Earth and Rock	Gilman & Co	Marshalltown, Iowa.
4	Earth and Rock	McArthur Brothers	1410 Gt. Northern Bldg., Chicago.
5	Earth and Rock	The Qualey Construction Co	Chicago.
6	Earth and Rock	Mason, Hoge & Co.	Louisville, Ky.
7	Rock	Mason, Hoge & Co.	Louisville, Ky.
8	Rock	Mason, Hoge, King & Co	Louisville, Ky.
9	Rock	Halvorson, Richards & Co	St. Paul, Minn.
10	Rock	E. D. Smith & Co	Philadelphia, Pennsylvania.
11	Rock	Mason, Hoge & Co	Louisville, Ky.
12	Rock	Mason, Hoge & Co	Louisville, Ky.
13	Rock	Mason, Hoge & Co	Louisville, Ky.
14	Rock	Smith & Eastman	502 First Na[illegible]nal Bank Building, Chicago.
14	Retaining Walls	Campbell & Dennis	Joliet, Ill.
15	Rock	Wright, Meysenburg, Sinclair & Carry	1301 Fisher Bldg., Chicago.
15	Reg'lat'g W'rks	Christie & Lowe	512 N. Y. Life Building, Chicago.
15	Reg'lat'g W'rks	Griffiths & McDermott Construction Co	40 Lakeside Building, Chicago.
16	Earth and Rock	Hayes Bros.	34th St. and Kedzie Ave., Chicago.
17	Earth and Rock	Heidmaier & Neu	908 Security Building, Chicago.
18	Earth and Rock	Gahan & Byrne	4209 S. Halsted St., Chicago.



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